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# Patient's global assessment of disease activity and patient's assessment of general health for rheumatoid arthritis activity assessment: are they equivalent?

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## Abstract

**Objectives—**To assess (A) determinants of patient's global assessment of disease activity (PTGL) and patient's assessment of general health (GH) scores of rheumatoid arthritis (RA) patients; (B) whether they are equivalent as individual variables; and (C) whether they may be used interchangeably in calculating common RA activity assessment composite indices.

**Methods—**Data of 7023 patients from 30 countries in the Quantitative Standard Monitoring of Patients with RA (QUEST-RA) was analysed. PTGL and GH determinants were assessed by mixed-effects analyses of covariance models. PTGL and GH equivalence was determined by Bland-Altman 95% limits of agreement (BALOA) and Lin's coefficient of concordance (LCC). Concordance between PTGL and GH based Disease Activity Score 28 (DAS28), Clinical Disease Activity Index (CDAI) and Routine Assessment of Patient Index Data 3 (RAPID3) indices were calculated using LCC, and the level of agreement in classifying RA activity in four states (remission, low, moderate, high) using $\kappa$ statistics.

**Results—**Significant differences in relative and absolute contribution of RA and non-RA related variables in PTGL and GH ratings were noted. LCC of 0.64 and BALOA of −4.41 to 4.54 showed that PTGL and GH are not equivalent. There was excellent concordance (LCC 0.95–0.99) for PTGL and GH based DAS28, CDAI and RAPID3 indices, and >80% absolute agreement ($\kappa$ statistics 0.75–0.84) in RA activity state classification for all three indices.

**Conclusions—**PTGL and GH ratings differ in their determinants. Although they are individually not equivalent, they may be used interchangeably for calculating composite indices for RA activity assessment.

Disease activity is an important concept in the evaluation of patients with rheumatoid arthritis (RA) in clinical care and research. Objective RA activity assessment, to guide treatment decisions, is recommended to achieve remission or at least low disease activity state.[1,2] Since there is no single 'gold standard' variable that refl ects RA activity in a valid and reliable fashion, composite indices, derived from multiple individual variables, have been developed for RA activity assessment.[3]

A patient self-report 'global measure' is part of the American College of Rheumatology (ACR) core data set and a component of multiple composite indices used for RA activity assessment and treatment response. The patient's global assessment is one of the outcome measures commonly included in these indices because it is reliable, sensitive to change, feasible (one item), and directly reflects the patient's overall perspective.[4,5] This 'global measure' has been defined either as patient's global assessment of disease activity (PTGL), which directs the patient to respond specifically to the effects of RA, or the patient's assessment of general health/global health (GH), which asks more generically about health. GH was originally a component of the Disease Activity Score (DAS)[6] and the subsequent modification of DAS28[7]; while PTGL was originally a component of Simplified Disease Activity Index (SDAI),[8] Clinical Disease Activity Index (CDAI),[9] Routine Assessment of Patient Index Data 3 (RAPID3)[10] and Patient Activity Scale (PAS and PASII).[11]

PTGL and GH have been customarily considered equivalent, and used interchangeably to calculate indices that they were not originally the component of.[12–14] In fact, the variable 'patient's global assessment' has been used without specifying whether it refers to PTGL or GH; or the term for one 'global measure' is used even though the assessment has been made for the other.[5,15–18]

There is no study that has assessed whether PTGL and GH scores have similar determinants, and whether they are equivalent as an individual variable for RA activity assessment. Two recent studies showed minimal influence on DAS28 scores calculated by using either PTGL or GH as the 'patient global measure'.[19,20] However, these studies were conducted in a single centre or a single country. Moreover, no data on the impact of using PTGL and GH interchangeably for other commonly used composite indices for RA activity assessment exist. The objectives of our study were to assess whether (A) determinants of PTGL and GH scores are similar; (B) they are equivalent as individual variables for RA activity assessment; and (C) they can be used interchangeably to calculate common composite indices used for RA activity assessment.

## METHODS

### Study population

The Quantitative Standard Monitoring of Patients with RA (QUEST-RA) study was initiated in 2005 to promote quantitative RA activity assessment, and to develop an international database of RA patients who received usual care from rheumatologists in ≥3 clinics in several countries. One hundred consecutive non-selected patients were recruited from each participating clinic.[21] Each study participant was assessed by the standard protocol to evaluate RA that consisted of a four-page patient self-report questionnaire and a three-page clinician assessment.[22]

### Study variables

PTGL was assessed by the question, 'In terms of joint tenderness (ie, joint pain associated with light touch) and joint swelling (ie, joint enlargement due to inflammation), how active would you say your rheumatic condition is TODAY?' on a 0–10 cm visual analogue scale (VAS) with 'not active at all' and 'extremely active' as anchors. This question is a component of RA Disease Activity Index (RADAI), and was originally denoted as 'arthritis now'.[23] In a validation study of RADAI, in 484 RA patients, the authors reported 'arthritis now' to be equivalent to PTGL.[24] GH was assessed by the question, 'Considering all the ways in which illness and health conditions may affect you at this time, please make a mark below to show how you are doing' on a 0–10 cm VAS with 'very well' and 'very poorly' as anchors.

Pain and fatigue were assessed by 0–10 cm VAS; physical function by the health assessment questionnaire (HAQ),[25] and morning stiffness (MS) duration by patient self-report questionnaire. Psychological distress was assessed by the psychological HAQ (psych HAQ) questionnaire which asks about the ability to deal with the usual stresses of daily life, feelings of anxiety and depression and a good night's sleep. The responses are calculated in the HAQ format, and scored from 0—3.[26] Physicians assessed 28 joints for tenderness (tender joint count on 28-tender joint count evaluation – TJC) and swelling (swollen joint count – SJC). Erythrocyte sedimentation rate (ESR) was measured in the local laboratory. Physicians completed information on comorbidities. Comorbidity burden was quantified by a composite comorbidity index (modified by excluding depression; range: 0–8) that comprised of 10 comorbid conditions, including pulmonary disorders, myocardial infarction, other cardiovascular disorders, stroke, diabetes mellitus, hypertension, fracture,

gastrointestinal ulcer, other gastrointestinal disorders and cancer.[27,28] Physicians noted the presence or absence of three other painful comorbidities (osteoarthritis, fibromyalgia and chronic back pain). Body mass index (BMI) was calculated using the standard formula.

### Composite RA activity indices

DAS28, CDAI and RAPID3 indices were selected as being representative of composite RA activity indices that are calculated from different types of individual components such as acute phase reactant (DAS28), joint counts (DAS28 and CDAI), and solely patient reported outcomes (RAPID3). The composite indices score were calculated using originally described formulas, and then recalculated using the alternative 'patient global measure' (table 1). The RA activity states were classified as remission, low, moderate or high disease activity using the accepted cut off values (table 1).

### Statistical analysis

Mixed-effects analyses of covariance models were used to model PTGL and GH measures as functions of demographic and medical characteristics using the MIXED procedure in Statistical Analysis System (SAS).[29] Demographic variables included age, gender, race (white, non-white) and education >12 years (yes, no); while medical characteristics included RA duration, patient's pain score, patient's fatigue score, HAQ, psych HAQ, TJC, SJC, ESR, MS duration (0, 1–60 and >60 min), comorbidity index score (0, 1–2, >2), BMI, fibromyalgia (yes, no), osteoarthritis (yes, no) and chronic back pain (yes, no). The reporting institution was included in the models as a random effect variable to adjust for correlations among subjects from the same institution. Partial R-square plots were constructed to understand the relative importance of individual variables to the PTGL and GH scores.

Lin's concordance coefficient (LCC) was used to quantify the level of concordance between PTGL and GH scores. LCC takes into account the correlation and the precision of agreement between two continuous variables, and represents how well a new set of observations reproduce an original set.[30] LCC values are interpreted as: 0–0.20 poor; 0.21–0.40 fair; 0.41–0.60 moderate; 0.61–0.80 substantial; and 0.81–1.00 almost perfect. The Bland-Altman plot was made by plotting the average of PTGL and GH versus the difference between PTGL and GH scores. Bland-Altman 95th percentile limits of agreement (BALOA) were calculated to define the range within which 95% of differences between PTGL and GH values fell.[31]

LCC was used to evaluate the level of concordance between PTGL and GH based DAS28, CDAI and RAPID3 scores. $\kappa$ statistics were used to assess the extent of agreement in RA activity states (remission, low, moderate and high) and were calculated using PTGL and GH. $\kappa$ values classified agreement as: 0–0.20 very poor; 0.21–0.40 poor; 0.41–0.60 moderate; 0.61–0.80 good; and 0.81–1.0 excellent.[32]

### Missing data

While most variables were over 90% complete (except psych HAQ with 80.2% completeness), overall, 43% subjects had at least one missing value. Multiple imputations of the missing data were performed using the MICE library[33] as implemented in R V. 2.14. The imputation process was repeated five times, producing five 'complete' data sets. These data sets were analysed as described above, resulting in five sets of results. These results were combined using the MIANALYZE procedure in SAS (see online supplementary material for details). All analyses were performed in SAS V. 9.3 (SAS Institute, Cary, North Carolina, USA)[29] or in R V. 2.14 (R Foundation for Statistical Computing, Vienna, Austria).[34]

# RESULTS

## Study population

The QUEST-RA database contained 7568 patients who were recruited from 83 sites in 30 countries at the time of the study analysis. Five hundred and forty-five (7.2%) patients were excluded from the analysis (465 patients had missing information for both PTGL and GH, and 80 patients had missing information on ≥5 study variables). Hence, the study results are based on data from 7023 (92.8%) patients (4004 (57%) with complete data, and 3019 (43%) with imputation of ≥1 missing variable information). The majority of the patients were women (79.8%), Caucasian (72.1%), and mean (SD) age was 55.2 (13.8) years. Most had established RA; mean (SD) duration was 10.8 (9.5) years. The mean (SD) value for PTGL and GH were 4.01 (2.7) and 4.04 (2.59), respectively. All three study indices showed moderately active mean RA activity (see online supplementary table S1 for the study population characteristics).

## Determinants of PTGL and GH

Pain, fatigue, HAQ, psych HAQ, TJC and gender were independent determinants of both PTGL and GH (table 2). In contrast to PTGL, GH was not associated with RA specific measures such as SJC, ESR and MS duration, but were with higher comorbidity burden, fibromyalgia and chronic back pain (table 2). Partial R-square plots, which show independent contribution of the variation of each variable after adjusting for all other remaining variables, showed important differences in relative contribution of individual variables in determining PTGL and GH scores (figure 1). Though pain was the single most important determinant for both PTGL and GH, it was relatively more important for PTGL score. The HAQ score was the second most important determinant of GH, while fatigue and SJC were more important for the PTGL score. Psychological distress influenced the GH rating relatively more than the PTGL rating. Female gender had a stronger negative association with GH than with PTGL.

## Equivalence of PTGL and GH as individual measures of RA activity

The LCC was 0.64 (95% CI 0.62 to 0.65). Figure 2 shows the Bland-Altman plot. The lowess curve (dashed line)—a non-parametric smoothing function—shows no systematic difference between the means of PTGL and GH across 0–10 score range with differences varying from slightly <0 to slightly >0. The BALOA of −4.41 to 4.54 are very wide for a 0–10 scale. Although the LCC indicates substantial degree of agreement between PTGL and GH, the very wide BALOA imply they are not equivalent, and may not be used interchangeably as an individual measure for RA activity assessment.

## Impact of using PTGL and GH interchangeably on composite indices for RA activity assessment

Table 3 shows the results of RA activity state classification, by DAS28, CDAI and RAPID3, calculated using either PTGL or GH score. There was >80% absolute agreement in disease activity state classification for all the three indices. The level of agreement, by the $\kappa$ statistics, was excellent between DAS28-PTGL and DAS28-GH as well as CDAI-PTGL and CDAI-GH, and good between RAPID3-PTGL and RAPID3-GH. Figure 3 provides graphical representation of concordance between the PTGL and GH based indices. The LCC was 0.98 for DAS28-PTGL and DAS28-GH, 0.99 for CDAI-PTGL and CDAI-GH, and 0.95 for RAPID3-PTGL and RAPID3-GH. These values reflect almost perfect concordance between PTGL and GH based indices.

## DISCUSSION

Our study found that PTGL and GH are associated with shared and unique RA and non-RA related variables with differences in relative contribution of these variables to the two 'patient global measures'. PTGL and GH are not equivalent as individual variables for RA activity assessment. However, they may be used interchangeably for calculating common composite indices with minimal effect on the RA activity assessment.

Although patient's 'global score' is widely used in RA research, only few studies have examined the factors that influence this score. All such studies have evaluated PTGL score determinants with heterogeneous results, partly from the comprehensiveness of variables used in statistical models of the studies. Pain and functional status were reported to be strongly associated with and of similar importance for PTGL score.[35,36] In another study, PTGL variance was independently explained only by pain and depression, without contribution of HAQ, TJC, gender, RA duration, ESR, C reactive protein (CRP) and radiographic abnormalities.[5] A recent study also found pain, depression and severity of stiffness, but not HAQ or DAS28, to be independently associated with PTGL.[37] While confirming these associations, our study also found fatigue, SJC, HAQ, TJC, ESR and gender as being independently associated with PTGL score.

No study has specifically assessed determinants of GH or the differences in determinants of PTGL and GH among RA patients. A study that came close to such assessment compared PTGL with EUROQoL generic 'feeling thermometer' VAS (EQ-VAS), which is a measure resembling GH, in 663 RA patients.[36] The patients were asked to indicate 'how good or bad your own health is today, in your opinion' on a vertical 0–100 VAS with 'worst imaginable health state' to 'best imaginable health state' as anchors. While pain and HAQ similarly and strongly associated with both scores, TJC had a stronger association with PTGL while comorbidities were more strongly associated with EQ-VAS. Sex and education were only associated with PTGL, while age was only associated with EQ-VAS. Though these results suggest some similarity to our findings (PTGL having stronger association with RA specific measures, while GH having stronger association with comorbidities), the two studies used different covariates, and are not directly comparable. For example, no assessment of fatigue, SJC or psychological distress was made in this study.

The impact of RA (RAID), a composite patient-derived measure comprising of pain, function, fatigue, sleep, physical wellbeing, emotional wellbeing and coping, has recently been developed upon European League Against Rheumatism (EULAR) initiative. PTGL had stronger correlation with all domains, compared with 'global assessment of health status' (ordinal response from 'excellent' to 'poor'),[38] further supporting our results that PTGL and GH represent different concepts in health status assessment.

While the mean difference was negligible and LCC showed substantial agreement between PTGL and GH scores, the BALOA showed that PTGL and GH scores can differ substantially in an individual patient. Hence, PTGL and GH may not be used interchangeably as individual variables for RA activity assessment. This issue assumes particular importance when considering the 'patient global assessment' measure for the ACR/EULAR provisional RA remission definition.[39] PTGL is specifically recommended to assess Boolean-based definition of RA remission, and our results show that GH may not be used for this purpose. By contrast, we did find that PTGL and GH may be used interchangeably in calculating commonly used composite indices for RA activity assessment. This is in agreement with two recent studies that showed the interchangeability of PTGL and GH for DAS/DAS28 calculation.[19,20] CRP was not used in the study because of the marked heterogeneity in measurement methods, normal range at local laboratories,

reporting methods, and the unavailability of CRP measurement at many participating centres in this multinational study. However, given our data on three study composite indices, we think that PTGL and GH may be used interchangeably for calculating the CRP based SDAI. SDAI is recommended for composite index based provisional definition of ACR/EULAR remission criteria.[39]

We recommend PTGL as the single 'patient global measure' of choice for clinical care and research as it more directly relates to RA specific measures, is less affected by comorbidities, and may be used to assess ACR/EULAR Boolean-based remission criteria. Though GH contributes more in the assessment of domains, such as functional status and psychological distress and better reflects comorbidity burden, the additional value of GH in comprehensive 'health status' assessment of RA patients needs further studies. The need for global questions to focus on disease activity was recognised and identified as an important point to consider when the ACR core set is reviewed.[40] Although specific methods for 'patient global assessment' have been suggested,[41,42] a variety of nomenclature, phrasing, type of rating scale, and anchors (see online supplementary table S2 for selected examples) have been used in different studies.[20,36,37] Though some evidence for similar validity among PTGL assessments using different techniques exists,[24,37] further research is needed to understand the impact of using different methods on the patient's global score.

Our study has limitations. First, the PTGL question in our study specifically asked about RA activity assessment in terms of joint pain and swelling. This may not reflect the true extent of global RA effect, such as fatigue and functional limitation, even though these variables were among the strongest PTGL determinants. Second, the cross-sectional design of the QUEST-RA study precludes comparative assessment of sensitivity to change for PTGL and GH. Moreover, patient expectations and perceptions vary according to whether there has been an improvement or worsening of health compared with the past.[43] Third, we do not have data on health-literacy of the QUEST-RA study patients. Health-literacy, which has moderate correlation with formal years of education, may affect the patient's understanding of PTGL and GH questions and hence their rating.[44] Fourth, the QUEST-RA study was conceived to enrol RA patients from several countries with differing healthcare systems, and social, cultural and economic backgrounds. Multiple dimensions related to culture such as ethnicity; belief about disease causation, course and outcome; patient-physician relation dynamics; and economics of healthcare may impact the patient's perception of disease and their global ratings.[45,46] To decrease variance from these non-RA related factors, every patient and physician in the study completed a standard protocol, validated and translated versions of the study questionnaires in patient's native language were used, and each study centre was included as a random effect in the statistical models used to assess PTGL and GH determinants to adjust for correlations between subjects seen at the same study centre. Finally, we lacked detailed data on socio-economic factors, and having patients from such varied backgrounds would make them difficult to be comparative. Hence, we used the broad category of education and ethnicity for our analyses.

In conclusion, we have shown that PTGL and GH scores are determined by shared, although with varying importance, and unique variables. PTGL is more influenced by RA related variables. Although PTGL and GH are not equivalent as individual variables for RA activity assessment, they may be used interchangeably for calculation of commonly used RA composite indices.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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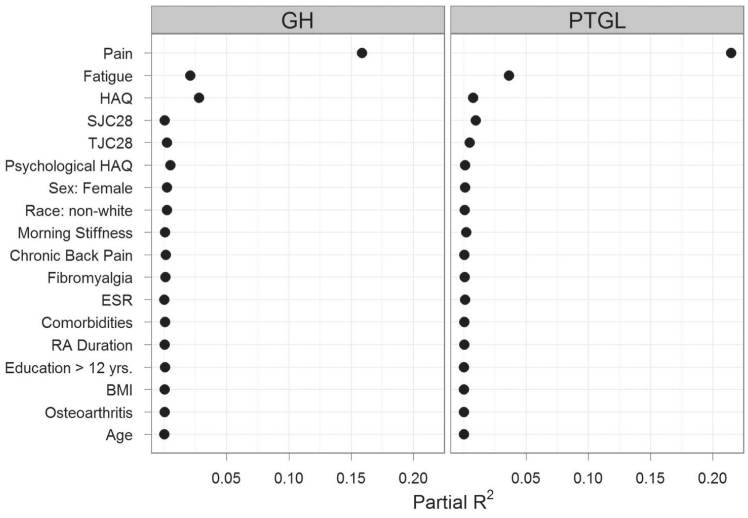


**Figure 1.**

Partial R-square plots showing variance of patient's assessment of general health (GH) and patient's global assessment of disease activity (PTGL) scores explained by individual variables after controlling for the effect of remaining variables. BMI, body mass index; ESR, erythrocyte sedimentation rate; HAQ, health assessment questionnaire; RA, rheumatoid arthritis; SJC, swollen joint count; TJC, tender joint count.

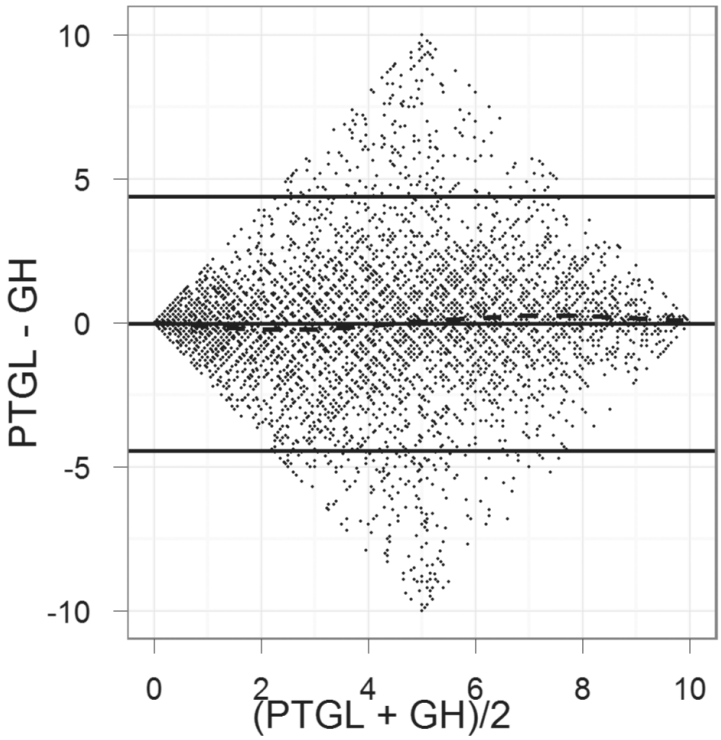


**Figure 2.**
Bland-Altman plot for agreement between patient's global assessment of disease activity (PTGL) and patient's assessment of general health (GH). The middle solid line represents the mean of the difference, and the top and bottom solid lines demarcate 95% limits of agreement between PTGL and GH. The dashed line is the lowess curve of the difference between measures versus the average of the measures.

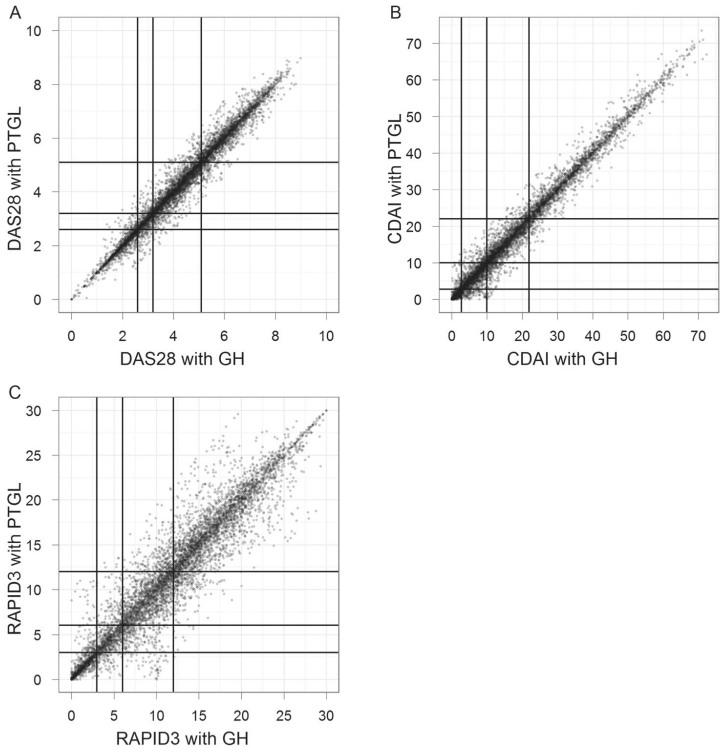


**Figure 3.**

Scatter plots of patient's global assessment of disease activity (PTGL) and patient's assessment of general health (GH) based (A) Disease Activity Score 28 (DAS28), (B) Clinical Disease Activity Index (CDAI) and (C) Routine Assessment of Patient Index Data 3 (RAPID3) scores. Horizontal (from bottom to top) and vertical lines (from left to right) represent cut-offs between remission and low, low and moderate, and moderate and high disease activity state for each index. Dots within each diagonal box represent concordant disease activity state using the PTGL and GH based indices.

## Table 1

RA disease activity indices: calculation and values for disease activity states*

| | | RA activity state | | | |
|---|---|---|---|---|---|
| **Index** | **Formula** | **Remission** | **Low** | **Moderate** | **High** |
| DAS28 | $0.56 * \sqrt{(TJC28)} + 0.28 * \sqrt{(SJC28)} + 0.70 * \ln(ESR) + 0.014 * GH$ | <2.6 | 2.6 to ≤3.2 | >3.2 to ≤5.1 | >5.1 |
| CDAI | TJC28+SJC28+MDGL+PTGL | <2.8 | 2.8 to ≤10 | > 10 to ≤22 | >22 |
| RAPID3† | HAQ+Pain+PTGL | <3 | 3 to ≤6 | > 6 to ≤12 | >12 |

*PTGL or GH rating was scored on 0–10 scale for CDAI and RAPID3, and 0–100 scale for DAS28.

†HAQ scored on a 0–10 scale for purpose of computing RAPID3 score.

CDAI, Clinical Disease Activity Index; DAS28, Disease Activity Score based on 28 joint evaluation; ESR, erythrocyte sedimentation rate; GH, patient's assessment of general health; HAQ, health assessment questionnaire; MDGL, physician's global assessment of disease activity; PTGL, patient's global assessment of disease activity; RA, rheumatoid arthritis; RAPID3, Routine Assessment of Patient Index Data 3; SJC28, swollen joint count on 28 joint evaluation; TJC28, tender joint count on 28 joint evaluation.

## Table 2

Determinants of PTGL and patient's assessment of GH scores*

| Variable | PTGL model | | GH model | |
|---|---|---|---|---|
| | Estimate (95% CI) | p Value | Estimate (95% CI) | p Value |
| Intercept | 0.5641 (0.2401 to 0.8881) | 0.0007 | 1.071 (0.7388 to 1.4032) | <0.0001 |
| Age | 0 (−0.0035 to 0.0036) | 0.9906 | 0.0003 (−0.0033 to 0.004) | 0.8599 |
| Sex (female) | −0.1224 (−0.2273 to −0.0174) | 0.0223 | −0.2067 (−0.31 19 to −0.1015) | 0.0001 |
| Race (non-white) | 0.0271 (−0.1105 to 0.1646) | 0.6985 | 0.0916 (−0.0485 to 0.2317) | 0.1999 |
| Education (>12 y) | 0.005 (−0.0893 to 0.0992) | 0.9178 | −0.0799 (−0.1736 to 0.0138) | 0.0948 |
| RA duration | 0.0027 (−0.002 to 0.0073) | 0.2579 | 0.0033 (−0.0014 to 0.008) | 0.1671 |
| Pain | 0.492 (0.4693 to 0.5148) | <0.0001 | 0.4146 (0.3916 to 0.4375) | <0.0001 |
| Fatigue | 0.1586 (0.139 to 0.1782) | <0.0001 | 0.1205 (0.1009 to 0.1401) | <0.0001 |
| MS duration, 1–60 m | 0.1473 (0.0405 to 0.2541) | 0.0069 | 0.0014 (−0.1086 to 0.1113) | 0.9808 |
| MS duration, >60 m | 0.3032 (0.1878 to 0.4185) | <0.0001 | 0.1075 (−0.0186 to 0.2336) | 0.0941 |
| HAQ | 0.3021 (0.2198 to 0.3844) | <0.0001 | 0.5965 (0.5134 to 0.6796) | <0.0001 |
| Psych HAQ | 0.0904 (0.0142 to 0.1667) | 0.0201 | 0.2235 (0.1459 to 0.3011) | <0.0001 |
| TJC28 | 0.0206 (0.0129 to 0.0283) | <0.0001 | 0.0148 (0.0068 to 0.0229) | 0.0003 |
| SJC28 | 0.0395 (0.0297 to 0.0493) | <0.0001 | 0.0069 (−0.0032 to 0.0171) | 0.1813 |
| ESR | 0.0023 (0.0004, 0.0042) | 0.0176 | 0.0001 (−0.0018 to 0.0021) | 0.8949 |
| Comorbidity index, 1–2 | −0.1006 (−0.1944 to −0.0068) | 0.0355 | −0.0698 (−0.1649 to 0.0254) | 0.1505 |
| Comorbidity index, >2 | −0.1164 (−0.2638 to 0.0309) | 0.1214 | −0.1591 (−0.3084 to −0.0097) | 0.0369 |
| Chronic back pain | −0.0903 (−0.2139 to 0.0333) | 0.1522 | 0.1696 (0.0462 to 0.293) | 0.0071 |
| Osteoarthritis | −0.0319 (−0.1549 to 0.0911) | 0.6112 | −0.0212 (−0.1435 to 0.101) | 0.7335 |
| Fibromyalgia | −0.2299 (−0.4702 to 0.0105) | 0.0609 | −0.2738 (−0.5218 to −0.0258) | 0.0305 |
| BMI | −0.0015 (−0.0106 to 0.0077) | 0.7488 | −0.0026 (−0.0117 to 0.0065) | 0.5785 |

*Referent group for continuous variables is represented by each one unit increase in that variable and for categorical variables is represented by absence of that variable; MS duration groups are compared to patients with no morning stiffness; and comorbidity index groups with patients with zero comorbidity index score.

BMI, body mass index; ESR, erythrocyte sedimentation rate; GH, patient's assessment of general health; HAQ, health assessment questionnaire; Ms, morning stiffness; PTGL, patient's global assessment of disease activity; Psych HAQ, psychological health assessment questionnaire; RA, rheumatoid arthritis; SJC28, swollen joint count on 28 joints assessment; TJC28, tender joint count on 28 joints assessment.

## Table 3

Cross-tabulation of disease activity state classification for DAS28, CDAI and RAPID3 indices calculated using PTGL and GH and associated agreement statistics

| | | Index based on PTGL* | | | | | |
|---|---|---|---|---|---|---|---|
| | | Remission | Low | Moderate | High | Absolute agreement | κ statistics |
| Index based on GH* | DAS28 | | | | | | |
| | Remission | 1141 (16.26) | 85 (1.21) | 9 (0.13) | 0 (0) | | |
| | Low | 112 (1.6) | 520 (7.41) | 109 (1.55) | 0 (0) | | |
| | Moderate | 17 (0.24) | 146 (2.08) | 2401 (34.22) | 183 (2.61) | | |
| | High | 0 (0) | 0 (0) | 134 (1.91) | 2166 (30.87) | 88.76% | 0.84† |
| | CDAI | | | | | | |
| | Remission | 730 (10.4) | 104 (1.48) | 5 (0.07) | 0 (0) | | |
| | Low | 169 (2.41) | 1421 (20.25) | 153 (2.18) | 0 (0) | | |
| | Moderate | 10 (0.14) | 207 (2.95) | 1846 (26.31) | 116 (1.65) | | |
| | High | 0 (0) | 0 (0) | 90 (1.28) | 2172 (30.96) | 87.92% | 0.83† |
| | RAPID3 | | | | | | |
| | Remission | 861 (12.27) | 97 (1.38) | 26 (0.37) | 0 (0) | | |
| | Low | 95 (1.35) | 513 (7.31) | 140 (2.0) | 6 (0.09) | | |
| | Moderate | 52 (0.74) | 215 (3.06) | 1501 (21.39) | 271 (3.86) | | |
| | High | 1 (0.01) | 8 (0.11) | 279 (3.98) | 2958 (42.16) | 83.13% | 0.75† |

*Values represent number of patients (per cent of all patients).

†p Value <0.001

CDAI, Clinical Disease Activity Index; DAS28, Disease Activity Score based on 28 joint evaluation; GH, patient's assessment of general health; PTGL, patient's global assessment of disease activity; RAPID3, Routine Assessment of Patient Index Data 3.