Simplified Disease Activity Index (SDAI)

General Description

Purpose. The SDAI combines single measures into an overall, continuous measure of RA disease activity. It is feasible to use for monitoring of RA disease activity in daily clinical practice.

Content. The SDAI includes a 28-swollen joint count, 28-tender joint count, patient global assessment of disease activity (PtGA) on a 10 cm visual analog scale (VAS), provider global assessment of disease activity (PrGA) on a 10 cm VAS, and C-reactive protein (CRP) in mg/dl.

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Versions. The SDAI is analogues to the Clinical Disease Activity Index (CDAI), however the SDAI includes laboratory measurement of CRP.

Number of items in scale. The SDAI has 5 items.

Subscales. None.

Populations. *Developmental/target.* Patients with RA.

Other uses. Not validated for other rheumatic disorders.

ACR core set components. Tender joint count, swollen joint count, PtGA, PrGA, acute-phase reactant value.

Administration

Method. Clinical assessment of joint counts and provider global assessment of disease activity combined with self-administered patient assessment of disease activity.

Training. Training is necessary for reliable assessment of joint counts.

Time to complete. Patient: approximately 10 seconds; Provider: approximately 2 minutes; Laboratory: waiting time for CRP varies by lab.

Equipment needed. None

Availability/cost. The SDAI may be used free of charge; no specialized form is needed.

Scoring

Responses.

Scale. The 28-swollen and 28-tender joint counts each range from 0-28. The PtGA and PrGA each range from 0-10. Normal CRP is < 1.0 mg/dl and may range from 0-10 mg/dl.

Score. The range of the SDAI is 0-86.

Interpretation of scores. The level of disease activity can be interpreted as remission (SDAI ≤ 3.3), low (3.3 < SDAI ≤ 11), moderate (11 < SDAI ≤ 26), or high (SDAI > 26).(5) A change of 16 for SDAI corresponds to a change of 1.2 for Disease Activity Score 28 (DAS28) and a SDAI change of 20.7 corresponds to a change in Health Assessment Questionnaire (HAQ) score of 0.22 indicating clinically significant change.(6, 7)

Method of scoring. The SDAI is calculated by adding the 5 items together.

Training to interpret. None.

Norms available. Reference values are available, and are useful for the interpretation of the disease activity scores from individual patients, see "interpretation of scores."

Psychometric Information

Reliability.

Test-Retest. The test-retest reliability of the SDAI has not been evaluated. The components of the SDAI are individually accepted as reliable in RA assessment.

Reproducibility. The SDAI was originally validated with additional patients within the original study(6) and later validated in multiple additional datasets.(5) Reproducibility of the SDAI was evaluated in a cross-sectional inception cohort of newly diagnosed RA patients seen every 3 months for 1 year (N = 91) and an observational routine care cohort (N = 279) with significant correlations at the $P < 0.001$ level as compared to DAS28, CDAI, and HAQ.(5)

Validity.

Content. The SDAI includes variables from the core set of measures used to assess outcomes in RA. No measures of disability or joint damage are included. The SDAI was evaluated using a survey of patient profiles among 21 rheumatologists which showed excellent agreement with the physician's ratings of the patients' disease activity.(6)

Criterion. The SDAI demonstrates linear correlation with the DAS28 ($r = 0.80\text{-}0.92$, $P < 0.0001$) and is highly related to patient reported pain (r =

0.660, P < 0.001).(8) Major improvement in SDAI as defined by decrease of at least 22 at 12 months corresponds to a mean increase of total sharp score of 1.1; identical to sharp score progression in good DAS responders. Larsen scores confirm results of Sharp scores.(6) The SDAI is 90% sensitive and 86% specific for prediction of clinicians' decision to change DMARD therapy and surpasses predictive ability of the DAS28 due to weighting of swollen joint scores.(9) Approximately 85% of patients classified as in remission by the SDAI have no swollen joints; 70% of patients classified as in remission by DAS28 have no swollen joints.(10)

Convergent. Median SDAI scores (11.6, range 0.07-46.60) are slightly higher (P < 0.001) than median CDAI scores (10.7, range 0-42.10) and demonstrate gender differential with median SDAI 12.2 (0.07-46.60, P < 0.001) in females and 8.0 (0.10-35.20, P < 0.001) in males.(8)

Predictive Validly. One study showed that over 3 years, patients who spend the majority of time in SDAI remission do not progress radiographically as compared to those who spent 50% or less time in remission.(10) SDAI was sensitive in discriminating between different ACR response categories and HAQ change scores (P < 0.0001).(11)

Construct. From baseline to SDAI remission, HAQ score improvement differs by degree of joint damage with about 25% of patients with moderate to severe joint damage having less than 50% improvement in HAQ as compared to patients with little joint damage having more than 80% improvement in HAQ.(7)

Responsiveness to change. As compared to the DAS28, HAQ, and ACR20% response criteria, the SDAI demonstrates a fairly consistent and proportional change with changes in the SDAI increasing slightly with time.(6) Change in the SDAI exhibits a linear relationship with the change in the HAQ ($r = 0.56\text{-}0.57$, $P < 0.0001$) and with the MHAQ ($r = 0.48$, $P < 0.0001$).(6)

Comments and Critique

The SDAI is based on the DAS28, and was developed to simplify complicated calculations of disease activity. The SDAI constitutes a simple numerical addition of individual measures on their original scale, overcoming problems of transformations and weighting used in other composite indices. There is no need to use a calculator or computer for calculations. The inclusion of both patient and provider derived data as well as a laboratory marker of inflammation gives face validity to the SDAI. The use of CRP measured in mg/dl, rather than Westergren erythrocyte sedimentation rate (ESR), is advantageous as it does not overweigh the laboratory variable in the final score. Pain assessment was not included in the SDAI as it is also reflected in the patient global estimate of disease activity. The HAQ-disability index was not included in the SDAI as it is not routinely done in clinical practice by many providers.(6) Additionally, loss of function as measured by the HAQ or other tools may be irreversible, with some considering addition of a functional measure in a composite index of disease activity confusing despite noting the importance of functional information in patient care.(10) Although gender appears to have a small effect on the SDAI score,(8) different disease activity cutoffs for male and female patients are not established.