Review

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Clinical measurement of disease activity in rheumatoid arthritis: why, how and utility of patient self-assessment

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Regular monitoring of disease activity and adjustment of treatment to achieve tight control of disease activity is important in rheumatoid arthritis (RA), as abrogation of inflammation and synovitis will achieve disease remission and best clinical outcomes. Self-assessment of disease activity by patients is an interesting concept currently under evaluation, potentially used in clinical practice to assist in achieving treat-to-target outcomes. In addition, it has the potential to improve patient engagement in their own control of their disease and at the same time improve adherence and awareness of their RA. In this review, the importance of disease monitoring in RA is discussed and several potentially useful self-assessment methods by patients (e.g., self-assessed joint counts and self-reported questionnaires) are presented with a discussion of its potential use in clinical practice.

Keywords: disease activity • joint counts • rheumatoid arthritis • self report

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LEARNING OBJECTIVES

Upon completion of this activity, participants will be able to:

- Describe the epidemiology and prognosis of RA
- Evaluate the ongoing assessment of RA activity
- Assess the value of patient self-assessment of joints in cases of RA
- Assess the value of patient disease activity scores and questionnaires in cases of RA

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Importance of disease monitoring in rheumatoid arthritis & tight control concepts

Rheumatoid arthritis (RA) is a chronic immune-mediated systemic inflammatory disease with prevalence of 0.2–1.2%, usually affecting females between the ages of 40 and 60 years old [1]. Synovitis is the hallmark of the disease with patients not only experiencing pain and swelling of joints, but fatigue and physical disability. It has been shown that clinical synovitis is strongly associated with radiographic progression [2,3]. If suboptimally treated, articular damage as well as occurrence of associated comorbidities will further lead to disability and socioeconomic decline [4,5]. Patients with RA have increased mortality rates compared with the general population, with standardized mortality ratios up to 3 (with ratio >1, indicating higher number of deaths than of expected cases) [6], largely related to functional status and inflammation levels [7,8].

Therefore, RA necessitates early aggressive treatment with disease-modifying antirheumatic drugs (DMARDs). By taking advantage of the 'window of opportunity' on the one hand, and by regularly adjusting treatment to achieve and remain in remission (i.e., absence of synovitis and inflammation), radiographic progression will be reduced, thus preserving physical function [9–11].

How is disease activity measured in RA?

Measuring disease activity is a challenge in RA as there is no single parameter that can be used on its own [12]. Measures used in assessing RA disease activity usually include formal joint counts, laboratory tests and, sometimes, patient self-report questionnaires that measure physical function, pain, global status and fatigue.

Importantly, disease activity is traditionally assessed by physicians through physical examination and by formally quantifying the number of joints, which are tender or swollen (joint counts), which enables clinical assessment of synovitis [13]. Joint counts are included in a number of core data sets of disease activity indices used in clinical practice and research. These indices are composite measures that usually include a physician's objective assessment of disease activity (e.g., tender joint count [TJC] and swollen joint count [SJC]), in addition with laboratory markers of inflammation (e.g., erythrocyte sedimentation rate [ESR] or CRP), as well as a patient assessment of the global state of their disease activity on a visual analog scale (VAS). The disease activity score (DAS) [14] and its more simplified form using 28 joints instead of the original 44 joints (known as DAS28) [15] has been widely used. A calculator, usually readily available, for example, custom-made calculators, the internet or smartphone apps, is required to derive the DAS score due to the weighting of the items in the formula. Hence, simpler composite indices such as the simplified disease activity index (SDAI) [16], or the clinical disease activity index (CDAI) [17], which do not require a calculator, have been proposed. The scores have various cutoffs for response, remission state, low, moderate or active disease states, which are illustrated in Table 1. However, there is no gold standard at present on which score is to be used.

Treating-to-target strategies in RA

Adapting treatment according to a set target to optimize treatment outcomes is now an established concept in RA. This is similar in management of other chronic diseases such as diabetes, for example, where the aim of achieving an HbA1C below 7% is considered a therapeutic target [21].

It has been shown that, strategies where a target is set, for example, achieving a DAS28 <3.2 are superior in regards to treatment outcomes, when compared with routine practice based on rheumatologist opinion alone [21–24]. We also know that just setting a treatment target (DAS28 <2.6) may not be enough. One should couple this to a fixed treatment protocol that outlines each therapeutic step that is to be taken if the target is not reached [25,26]. Regular monitoring of patients with a DAS evalu-

Table 1. Some of the disease activity composite indices, components and cutoff values.

Composite score or response criteria	Variables incorporated	Levels of cutoff
ACR core set of disease activity measures for clinical trials/ACR response criteria [18]	TJC, SJC, patients' assessment of pain, PGA, PhyGA, patients' assessment of physical function, laboratory evaluation of one acute-phase reactant	20% improvement in core set 50% improvement in core set 70% improvement in core set
DAS [14]	RAI, SJC, PGA, ESR	DAS >3.7 high DAS ≥2.4 moderate DAS ≥1.6 low DAS <1.6 remission [19]
DAS28 [15]	TJC28, SJC28, PGA, ESR/CRP	DAS28 >5.1 high DAS28 >3.2 moderate DAS28 <2.6 remission
EULAR response criteria [20]	DAS	Good response (improvement in DAS >1.2 and follow-up DAS ≤2.4) Nonresponders (improvement in DAS ≤0.6 or improvement >0.6 but ≤1.2 and follow-up DAS >3.7)
SDAI [16]	TJC28, SJC28, PGA, PhyGA, CRP	SDAI >26 high SDAI ≤26 moderate SDAI ≤11 low SDAI ≤3.3 remission
CDAI [17]	TJC28, SJC28, PGA, PhyGA	CDAI >22 high CDAI ≤22 moderate CDAI ≤10 low CDAI ≤2.8 remission

ACR: American College of Rheumatology; CDAI: Clinical disease activity index; DAS: Disease Activity Score; DAS28: Disease Activity Score 28; ESR: Erythrocyte sedimentation rate; EULAR: European League Against Rheumatism; PGA: Patient global assessment of disease; PhyGA: Physician global assessment of disease; RAI: Ritchie Articular Index; SDAI: Simplified disease activity index; SJC: Swollen joint count; SJC28: Swollen joint count 28; TJC: Tender joint count; TJC28: Tender joint count 28.

ation of at a minimum, monthly, if disease is active and at least quarterly if disease is less active is recommended [27,28], for example, with the goal of achieving clinical remission [28,29]. Long-term clinical remission is achievable in up to 60% and the ability to step-down, or discontinue medication (long-term drug-free remission), is now potentially possible [18].

The reality in clinical practice

In reality, it is clear that not all physicians quantitatively assess disease activity such as the collection of DAS, nor do they strictly follow treating-to-target principles [30,31]. An English study has shown that therapeutic decision was most often linked to the findings of the physician as compared with the exact value of the DAS [31]. Similarly, a large Canadian study had shown that escalation is more influenced by physician global assessment of activity rather than quantitative measurement of disease activity [32].

What can the patient perform to assist with disease monitoring?

Furthermore, patients can potentially assist with disease monitoring through performing a physical examination on themselves or the use of self-reported questionnaires as listed in Table 2. Potentially, they can carry out assessments of disease activity that physicians traditionally use, provided the measure is comparable with that derived by physicians and also technically feasible.

What are the potential benefits of self assessment?

The first advantage of self-assessment of disease activity is the frequency of this assessment. Indeed, treating

Table 2. Possibilities for patient self-assessment of disease activity in rheumatoid arthritis.

Self-performed physical assessment	Self-reported questionnaires
Tender joint count Swollen joint count Use joint counts to derive a composite disease measure (e.g., DAS28, SDAI)	Visual analog scale of pain Visual analog scale of global assessment of disease activity Self-reported questionnaires on: • General impact of disease (e.g., RAID) • Disability (HAQ) • General disease activity/impact (e.g., RAPID)

DAS28: Disease Activity Score 28; HAQ: Health assessment questionnaire; RAID: Rheumatoid Arthritis Impact of Disease score; RAPID: Routine Assessment of Patient Index Data; SDAI: Simplified disease activity index.

to target relies on very regular assessments of disease, which may be difficult to perform given time constraints and external factors such as waiting lists to see rheumatologists. Patient self-assessment can be more regular and frequent [33].

Disease flares usually occur between clinic visits and physicians do not typically address its occurrence, impact and management during consultations [34]. Although there is still no consensus on the definition of disease 'flare', the feasibility of patients in identifying disease flares between clinic visits through tender and swollen joints have been demonstrated [35].

Patients' active role in assessment of disease activity may also help improve disease awareness and adherence to treatment. It is well known that there are significant differences in perception of disease activity between patients and physicians that place barriers to escalation of treatment in RA [36,37]. A self-awareness of disease activity, for example, in the case of self-derived physical signs such as tenderness and swelling or even the DAS score, may encourage patients to agree with escalation of treatment proposed by their physician.

In addition, patient self assessment such as that through questionnaires enables domains not routinely assessed in clinics but important to patients to be captured. This information will enable physicians to better tailor treatments for individual patients.

Self monitoring of joints in RA

Self assessment of joint counts

Several authors have reported the possibility for patients to self-assess their joints [38,39] as a potential way of monitoring for disease activity. Some issues need to be considered before this outcome measure can be formalized in clinical practice:

- Do self-reported joint counts measure the same thing as physician-reported joint counts? Indeed, the physician-reported joint count is considered as the 'gold standard'.
- Do they bring important information in addition to physician assessments?
- Is the measure reproducible when derived by the same patient over time (intraobserver reliability)?
- Is the measure comparable with that derived by another observer, for example the physician (interobserver reliability)?
- Can self-reported joint counts be easily derived (feasibility)?
- Are there any guidelines to standardizing this measure and ways to improve its metrological properties, for example reliability?
- Do self-reported joint counts have good longitudinal validity? For example, can they predict radiographic progression or disability?

A number of studies have evaluated the validity of joint counts by patients, and have shown that patient-reported TJCs have better correlation with that derived by physicians or metrologists than SJCs [38]. Most studies have only evaluated the performance of joint counts directly before consultation with doctors, but whether it added further important information has not been conclusively investigated.

It has been widely known that reliability of joint counts has been an issue, even for physicians [39]. The evaluation of reliability of self-assessed joint counts by patients found that the intraobserver reliability for patient-derived joint counts appeared to be satisfactory [39]. Patient-derived TJC was excellent with the intraclass correlation coefficient (ICC; which is considered satisfactory if above 0.6) of 0.94 in one study [40]. For SJC, this was more variable, with ICC between 0.56 and 0.89 [39].

However, the interobserver reliability of patient-derived joint counts, that is, when patients are compared with healthcare professionals (either physician or metrologist) is even more wide ranging, especially for the SJC [39]. Specifically for the 28 joint count, ICC ranged as low as 0.31 to being moderate at 0.55 [40–42]. On the other hand, patient-reported TJC had better reliability when compared with healthcare professionals. Specifically for studies evaluating the TJC of 28

joints, four studies reported ICC ranging from 0.70 to 0.92 [40–43].

The evidence suggests that patients could act as their own observer in measuring joint counts between clinic visits over time and as an outcome measure in clinical trials. However, interobserver reliability especially SJC is still variable and poor, especially for patients [39].

Regarding the feasibility aspect, we have previously developed a method of self-assessment for tenderness and swelling by patients, which was adapted from the European League Against Rheumatism (EULAR) handbook of clinical assessments [44]. Documentation of findings can be either in text form or, more commonly, in a mannequin form. It appears that self-assessed joint counts are feasible, not very time-consuming and well accepted by selected patients.

However, there are no data on the longitudinal validity of joint counts on predicting radiographic progression.

Self assessment of DAS

Self-assessed TJC and SJC enable patients to derive composite disease measures. The DAS is an example of this, provided there is access to a laboratory marker such as ESR and a calculator to derive the score. A patient VAS from 0 to 100 mm can be easily derived by patients either at home, or before consultations.

Patient-derived DAS have also been evaluated where patients self assess their joints for tenderness and swelling, which are used to calculate the DAS (which includes TJC, SJC, patient global assessment on VAS and ESR). The face and content validity of this has been illustrated [41,45–46].

A large French randomized controlled trial, COMEDRA, further evaluated the feasibility and benefits of self-assessed DAS, through a nurse-led program aimed at educating RA patients to self assess their joint counts to calculate DAS28 between clinic visits [33]. Patients in the self-assessed DAS28 arm were encouraged to show their physicians the trend of their DAS28 scores, and changes in treatment were made at the discretion of the treating physician. Over the course of 6 months, patients randomized to the self assessment were largely compliant with home self assessment of joints with 89% completing their assessments throughout the 6-month study. The record of the self-assessed DAS28 had prompted a DMARD therapy change by their treating physician in 17.2% of the active group versus 10.9% in the control group ($p = 0.0012$; odds ratio [OR]: 1.70; 95% CI: 1.17–2.19) [33]. Although quality of care may be improved, the feasibility of large-scale self assessment of DASs on the logistics of workflow need to be considered, particularly when health budgets for resources are already tight.

Other composite scores such as SDAI can also be easily derived, provided there is access to a CRP result. As it is an acute-phase reactant, the result needs to be recent to the time of assessment, that is, at least within the last week.

The RADAI is a patient-assessed measure of disease activity in RA that can assist or replace physician's assessment of disease activity. It is a five-item questionnaire that combines global disease activity, pain, swelling and morning stiffness with self-reported tender joints [47]. This is a purely patient-administered tool aiming to help in a busy clinical setting. However, there is no physician-equivalent measure, it lacks well-defined disease states and is not used frequently in clinical practice. In contrast to the DAS and SDAI, its sensitivity to change and relationship with radiographic progression and disability is unclear.

Improving self assessment of clinical synovitis by patients

There is a need to improve the reliability of patient self-assessed joint counts, in order for self assessment of joint counts and its inclusion into composite indices to be used in routine practice. Similar concerns are present even among physicians [39,48]; however, there is limited literature on ways of standardization and training [39]. In particular, there is still insufficient evidence that training improves patient joint count reliability [39]. Specifically, structured teaching was rarely used with simple verbal instruction used for patient joint counts studies [42,49]. Although the authors reported improvements in both TJC and SJC reliability by patients, the evidence that training truly improved reliability appeared inconclusive. In these studies, the duration of training was short, between 5–15 min, and there was no longitudinal follow-up. Other ways to improve self-assessment could include tools using ultrasound (US) to educate patients on how to assess for clinical synovitis, as recent evidence has shown that US may have positive effects on improving the ability to detect for clinical synovitis through physical examination by 'positive' feedback for physicians [50].

Self assessment of RA by questionnaires

Patient-reported measures of disease activity using questionnaires have been evaluated and developed over the last 20 years. The advantages are that it creates the potential for offsite home monitoring with the possibility of increased frequency in measuring disease activity. In addition it enables capturing of important aspects often neglected, such as disability and impact of disease, which are important in management of RA [51]. Self assessments have been developed to measure concepts important to RA patients. Several examples

of self-reported questionnaires have been listed in Table 2. These questionnaires either try to measure disease activity, or the impact of disease on the patient, an overall general measure of status of disease or functional impairment and health. There is a great deal of controversy about which of these measures are best, and which components are important to capture.

Patient global assessment of disease

Patient global assessment of disease (PGA) is a simple patient-completed VAS that measures the overall way that RA affects the patient at a specific time period [52]. The statement is simply as follows: "considering all of the ways your arthritis has affected you, how do feel your arthritis is today?", although there is debate whether 'today' is appropriate in the question for a time window. The best anchor (lowest score) is on the left hand side and the worst anchor (highest score) on the right side. PGA does not measure disease activity solely, but also pain, quality of life as well as comorbidities and even psychological distress [53]. The VAS of PGA is a simple measure, which has been incorporated in composite disease scores and outcome measures in general. It would not be logical to adapt treatment based on PGA alone as it lacks face validity with absence of provider-derived data or laboratory values. These limitations are also true for patient assessment of pain or fatigue.

Routine Assessment of Patient Index Data

Patient-reported disease activity measures such as Routine Assessment of Patient Index Data (RAPID) have gained popularity due to its ease of use in the clinical setting, introduced to encapsulate different facets of a patient's condition [54,55]. There are several versions of RAPID with most versions excluding the incorporation of joint counts due to the perceived poor interobserver reliability [56]. Only a few of the RAPID questionnaires are purely patient-only questionnaires. RAPID is a feasible self-reported questionnaire based on the American College of Rheumatology (ACR) core set measures. RAPID3 is the most frequently used and best-validated measure among the various versions [56]. It comprises primarily of three domains (physical function, pain and patient global estimate of status as measured by a multidimensional health assessment questionnaire [HAQ]). Although it was developed specifically for RA patients, RAPID3 has been used in other rheumatic conditions. Criterion validity when compared with composite disease activity measures is good. Intraobserver reliability of the RAPID3 is also good. Although RAPID has not been evaluated for sensitivity to change, it comprises combinations of ACR core set measures that have been shown to be sensitive to change [56]. This longitudinal validity over longer periods of time and the effects of response shift bias are not well understood. However, its use is popular, especially in the USA and also parts of Europe.

The usefulness of patient self-assessment of RAPID in between visits has not been specifically studied, to our knowledge, but the potential to apply this tool in this situation is encouraging. There are also no definite data on the adaptation of treatment based on RAPID results.

RA impact of disease

The RAID questionnaire was developed as an international collaboration between patients with RA, rheumatologists and healthcare professionals, and it is a patient-derived composite measure of the impact of RA [57]. It comprises seven domains with a numerical rating scale from 0 to 10 on the following: pain, functional capacity, fatigue, physical well-being, emotional well-being, sleep and coping, as illustrated in Figure 1. The RAID has been validated in a large European population of RA patients and is well correlated to patient global assessment, and other patient-related outcomes, is sensitive to change and shown to have good intraobserver reliability. However, the longitudinal validity over longer periods of time has not been evaluated. The RAID score is an outcome measure that enables better understanding of the patients' perspectives. The cutoffs for a clinical significant improvement and the level for patient acceptable state have been determined [58]. Thus, the RAID may be a helpful questionnaire to better understand the patient's perspective in RA. However again, treatment adaptations based on RAID results have not been validated.

Self assessment of HAQ

Self assessment of patients' functional status may also be important on top of disease activity assessment. The HAQ is a validated questionnaire in RA [59], and is as informative as joint counts, radiographic or laboratory data for assessment of baseline status and change during interventions. It is also predictive of long-term outcomes such as mortality and future physical disability [60]. The feasibility of autonomous assessment of HAQ electronically has been demonstrated [61]. However, we are lacking data on adjustment of treatment based on self-assessed HAQ alone.

Modern technology & self assessment

As we have seen, patients can now take an active part in disease activity monitoring in RA. However, there are issues around patient training, patient selection and feasibility of such a self-assessment.

1. Pain
Circle the number that best describes the pain you felt due to your rheumatoid arthritis during the last week:

None	0	1	2	3	4	5	6	7	8	9	10	Extreme

2. Functional disability assessment
Circle the number that best describes the difficulty you had in doing daily physical activities due to your rheumatoid arthritis during the last week:

No difficulty	0	1	2	3	4	5	6	7	8	9	10	Extreme difficulty

3. Fatigue
Circle the number that best describes how much fatigue you felt due to your rheumatoid arthritis during the last week:

No fatigue	0	1	2	3	4	5	6	7	8	9	10	Totally exhausted

4. Sleep
Circle the number that best describes the sleep difficulties (i.e., resting at night) you felt due to your rheumatoid arthritis during the last week:

No difficulty	0	1	2	3	4	5	6	7	8	9	10	Extreme difficulty

5. Physical well-being
Considering your arthritis overall, how would you rate your level of physical well being during the past week? Circle the number that best describes your level of physical well-being:

Very good	0	1	2	3	4	5	6	7	8	9	10	Very bad

6. Emotional well-being
Considering your arthritis overall, how would you rate your level of emotional well-being during the past week? Circle the number that best describes your level of emotional well-being:

Very good	0	1	2	3	4	5	6	7	8	9	10	Very bad

7. Coping
Considering your arthritis overall, how well did you cope (manage, deal, make do) with your disease during the last week:

Very well	0	1	2	3	4	5	6	7	8	9	10	Very poorly

Figure 1. Rheumatoid arthritis impact of disease score.
Reproduced with permission from [57].

With improved technology and increasing access to the internet such as by computer or through smartphone apps, the feasibility of self-assessments both for physical examination and questionnaires has improved. Secured internet portals enable patients to self-assess and record information from home to assist with monitoring of disease between clinic visits.

Previous studies have shown that online computer systems are a good option for regularly capturing clinical data and patients' attitudes towards electronic capturing [43,62]. Involvement and knowledge may then empower patients by establishing a decision-making process on an equal level between rheumatologist and patient and start up the dialogue about implementation of tight control strategies. This might also help to

motivate patients to comply with proposed therapeutic interventions.

For example, SANOIA, a French website portal that serves a port of exchange between patients with RA and their rheumatologist, is an initiative to use self report of data by patients to assist with RA management [63]. Patients and their physician can access secured electronic information regarding their disease control and medical information about their RA, for example DAS recorded by their physician, and at the same time, follow and record important patient information in the form of RAID, HAQ and RAPID3. This enables patients not only to empower them in the management of their disease but also improve education and awareness of their disease and at the same time monitoring of their disease progression. This initiative had only been launched this year, and already more than 3000 patients in France have started using this portal to follow their disease. Clearly, such tools should be further assessed.

Conclusion

There is an increased interest in including patient-self assessment in disease monitoring in RA, especially with the use of online websites for home monitoring.

Self-assessed outcome measures such as joint counts and also composite DASs are an ideal way to assist in monitoring between clinic visits. However, problems with interobserver reliability such as self-assessed joint counts need to be further addressed. Although training can potentially assist with this, the method and duration of training is still unclear.

Self-reported questionnaires are an efficient way of capturing disease activity and impact of disease experienced by patients. The feasibility of using this in-home monitoring has been evaluated. However, the challenge is to find the best combination of self-assessment measures to use in routine clinical practice, and to assess how physicians can integrate these findings in clinical decision-making.

Executive summary

Importance of disease monitoring in rheumatoid arthritis & tight control concepts

- Rheumatoid arthritis (RA) necessitates early aggressive treatment with disease-modifying antirheumatic drugs (DMARDs).
- By taking advantage of the 'window of opportunity'on the one hand, and by regularly adjusting treatment to achieve remission (i.e., absence of synovitis and inflammation), radiographic progression will be reduced, thus preserving physical function.

How is disease activity measured in RA?

- Measuring disease activity has been a challenge in RA as there is no single parameter that can be used on its own to determine the exact disease activity of the patient.
- Disease activity is traditionally assessed by physicians through physical examination and by formally quantifying the number of joints, which are tender or swollen (joint counts). Composite disease measures such as disease activity score incorporate joint counts as well as laboratory measures of inflammation in its calculation.

What can the patient perform to assist with disease monitoring?

- Patients can potentially assist with disease monitoring through performing a physical examination on themselves or the use of self-reported questionnaires.

What are the potential benefits of self-assessment?

- Patient self assessment can be very regular and frequent.
- Patients' active role in assessment of disease activity may also help improve disease awareness and adherence to treatment.
- Domains not routinely assessed in clinics but important to patients can be captured.

Self monitoring of joints in RA

- It has been widely known that reliability of joint counts derived by patients has been an issue especially for swollen joints.

Self assessment of disease activity scores

- Self-assessed tender joint count and swollen joint count enable patients to derive composite disease measures.
- This may be less liable to interobserver variation.

Self assessment of RA by questionnaires

- Various patient self-report questionnaires can be used to capture various aspects of disease activity, impact and disability, including patient global assessment of disease activity, Routine Assessment of Patient Index Data, RA impact of disease, and health assessment questionnaire.

Conclusion

- There is an increased interest in including patientself assessment in disease monitoring in RA, due to improved quality standards and the importance of capturing disease activity measures.
- The challenge is to find the best combination of self-assessment measures to use in routine clinical practice, and to assess how physicians can integrate these findings in clinical decision-making.

Future perspective

The use of self assessment in monitoring of disease activity in RA is an interesting concept, which can potentially assist in achieving treat to target outcomes. The feasibility and validity of various methods are being evaluated at present. With the increasing adaptation of technology, monitoring of disease between clinic visits at home will be possible. Choosing which outcome measure is most suitable is still debatable and will require ongoing research.

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Clinical measurement of disease activity in rheumatoid arthritis: why, how and utility of patient self-assessment

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Activity evaluation: where 1 is strongly disagree and 5 is strongly agree.					
	1	**2**	**3**	**4**	**5**
The activity supported the learning objectives.					
The material was organized clearly for learning to occur.					
The content learned from this activity will impact my practice.					
The activity was presented objectively and free of commercial bias.					

1. You are seeing a 48-year-old woman with a new diagnosis of rheumatoid arthritis (RA). What can you tell her in general about the nature and prognosis of RA?
   - ☐ **A** The overall prevalence of RA is 0.2% to 1.2%
   - ☐ **B** RA usually affects women older than 60 years
   - ☐ **C** Clinical synovitis fails to correlate with radiographic progression of RA
   - ☐ **D** RA does not affect overall mortality

2. What should you consider regarding the principles of the assessment of RA severity and its effect on treatment?
   - ☐ **A** There is no single best practice to measure disease activity in RA
   - ☐ **B** Target-based treatment of RA offers no advantage in outcomes compared with routine assessment by a rheumatologist
   - ☐ **C** Monitoring with a disease activity score should be performed at least twice annually among patients with active RA
   - ☐ **D** Most physicians follow treat-to-target principles in the management of RA

3. You instruct the patient on self-assessment of her joints. Which of the following statements regarding this practice is ***most*** accurate?
   - ☐ **A** Swollen joint counts by patients correlate better with physicians' assessments compared with tender joint counts
   - ☐ **B** The intraobserver reliability for patient-derived joint counts is poor
   - ☐ **C** The interobserver reliability of patient-derived joint counts is variable
   - ☐ **D** Patient assessment of joint counts has been demonstrated to reduce radiographic progression and disability

4. The patient is also enlisted to provide disease activity scores and a questionnaire on RA activity. What should you consider regarding this self-assessment?

- ☐ **A** Research has demonstrated that self-assessment of disease activity scores can influence disease-modifying antirheumatic drug therapy
- ☐ **B** The best use of the Patient Global Assessment of Disease is to affect treatment decisions
- ☐ **C** The criterion validity of Routine Assessment of Patient Index Data (RAPID) compared with composite disease activity is poor
- ☐ **D** RAPID requires information from the patient only