

Identification of Case Complexity and Increased Health Care Utilization in Patients With Rheumatoid Arthritis

NATHALIE KOCH,¹ FRIEDRICH STIEFEL,¹ PETER DE JONGE,² JAAP FRANSEN,³
ANNE-MARIE CHAMOT,⁴ JEAN-CHARLES GERSTER,⁴ FRITS HUYSE,² AND ALEXANDER K.-L. SO⁴

Objectives. To document biopsychosocial profiles of patients with rheumatoid arthritis (RA) by means of the INTERMED and to correlate the results with conventional methods of disease assessment and health care utilization.

Methods. Patients with RA (n = 75) were evaluated with the INTERMED, an instrument for assessing case complexity and care needs. Based on their INTERMED scores, patients were compared with regard to severity of illness, functional status, and health care utilization.

Results. In cluster analysis, a 2-cluster solution emerged, with about half of the patients characterized as complex. Complex patients scoring especially high in the psychosocial domain of the INTERMED were disabled significantly more often and took more psychotropic drugs. Although the 2 patient groups did not differ in severity of illness and functional status, complex patients rated their illness as more severe on subjective measures and on most items of the Medical Outcomes Study Short Form 36. Complex patients showed increased health care utilization despite a similar biologic profile.

Conclusions. The INTERMED identified complex patients with increased health care utilization, provided meaningful and comprehensive patient information, and proved to be easy to implement and advantageous compared with conventional methods of disease assessment. Intervention studies will have to demonstrate whether management strategies based on INTERMED profiles can improve treatment response and outcome of complex patients.

KEY WORDS. Rheumatoid arthritis; INTERMED; Biopsychosocial; Case complexity; Health care utilization.

INTRODUCTION

While some patients with rheumatoid arthritis (RA) are satisfied with their quality of life despite a poor functional status, others with a good clinical outcome report low levels of quality of life and show higher levels of health care utilization for physician visits and hospitalizations (1). Biologic parameters, such as erythrocyte sedimenta-

tion rate or joint counts, only partly assess the impact of disease and show weak correlations with pain and distress (2,3). The importance of psychosocial factors in RA has therefore been recognized (4–9), and assessment of subjective health status has become a standard method of evaluating the impact of disease (10).

Several isolated factors, such as presence of depression or anxiety (1,11–13), perception of control (14), coping style (15), stressful life events (16), social support (17), or immune activation (18), have been found to explain small parts of the variance of psychological distress and disease consequences. To evaluate the consequences of RA, it may therefore be important not to restrict measurements to one or a few unidimensional constructs (3). On the other hand, comprehensive, detailed, and complex instruments may be too time-consuming to use in the clinic setting (19–22).

For this reason, an instrument—called INTERMED—has been developed. The INTERMED is an observer-rated instrument, which complements the traditional medical history with a structured assessment of biopsychosocial and health care–related aspects of disease. The INTERMED provides comprehensive patient information and its score reflects the degree of case complexity and related health care needs. It

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¹Nathalie Koch, MD, and Friedrich Stiefel, MD, Psychiatry Service, University Hospital, Lausanne, Switzerland; ²Peter de Jonge, PhD, and Frits Huyse, MD, Psychiatry Service, Free University Hospital, Amsterdam, The Netherlands; ³Jaap Fransen, MSc, Rheumatology Service, University Hospital, Zürich, Switzerland; ⁴Anne-Marie Chamot, MD, Jean-Charles Gerster, MD, and Alexander K.-L. So, PhD, FRCP, Rheumatology Service, University Hospital, Lausanne, Switzerland.

Address correspondence to Friedrich Stiefel, MD, Psychiatry Service, University Hospital, 1011 Lausanne, Switzerland.

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has been developed to foster integrated and coordinated care, especially for patients with chronic diseases. Complex patients are those who have somatic and psychosocial comorbidities and who require mutual adjustment of different types of care delivery (23). Articles about the rationale (24) and the development and description (25) of the INTERMED as well as its reliability (25), validity (26), and predictive validity (27–30) have been published or are in press.

The aim of this study was to compare the clinical and scientific utility of the INTERMED in patients with RA with conventional methods of disease assessment and to evaluate whether the INTERMED would identify complex patients with increased health care utilization.

SUBJECTS AND METHODS

Subjects. Between April and October 1999, a total of 85 outpatients of the Rheumatology Service of the University Hospital Lausanne were asked to participate in the study. Seventy-five were willing to participate and signed an informed consent document. Sixty-four of the 75 patients also participated in the Swiss Clinical Quality Management study (SCQM) (31,32), which was conducted between September 1997 and November 1999. In only 3 cases was there a time difference of 1 year or more between the assessments of these 2 studies.

Interview and measurements. All patients underwent the INTERMED interview with the first author (NK), who was familiarized with the INTERMED scoring manual and then conducted 3 interviews in the presence of the second author (FS), who codeveloped the INTERMED.

INTERMED. The INTERMED synthesizes information from 4 domains: biologic, psychological, social, and health care. These domains are assessed in the context of time (history, current status, and prognosis) and contain variables known from clinical experience or scientific evidence to reflect the degree of case complexity and related health care needs (25–30) (see Appendix). Within each of the 4 domains, 2 pertinent variables of the patient's history and current status and 1 pertinent variable of the patient's prognosis are rated with a score ranging from 0 to 3. A high score indicates a higher degree of case complexity and reflects an increase in health care needs. The ratings are not disease-specific but generic and applicable to any somatic disease. The scoring system allows a maximum score of 15 for each of the domains (biologic, psychological, social, and health care) and a maximum total score of 60. Because the INTERMED has been developed to foster comprehensive patient assessment, we do not advocate the use of subscales (e.g., results of the psychological domain only). Studies (25,26) indicate that the clinical interview and the scoring can be completed within 15 minutes once the interviewer has gained experience with the INTERMED (that is, by interviewing between 5 and 10 patients). Up to now, the INTERMED has been utilized in European countries only. There may be one or two items that may not have the same importance in other regions of the world

(e.g., where the health care system does not provide specialist consultation). It is unknown whether the INTERMED will have to be modified in such regions or whether its key elements (e.g., generation of biopsychosocial profiles for case management, predictive validity) remain operational.

Swiss Clinical Quality Management (SCQM) for RA.

The SCQM is a national prospective study with the aim to improve patient care and health outcome in RA by using a measurement improvement system (31–33). Patients undergo standardized health status measurements once a year, the results of which are collected and analyzed on a national level. Results are returned to the rheumatologist, who may adjust treatment accordingly. Measurements include different questionnaires for the patients and the physician: the Health Assessment Questionnaire (HAQ) (34), the Rheumatoid Arthritis Disease Activity Index (RADAI) (35), a sociodemographic questionnaire, the Medical Outcomes Study Short Form 36 (SF-36) (36), disease characteristics, joint counts, blood sedimentation rate, a comorbidity questionnaire (37), radiologic scores, and medical and surgical treatment listing. Of this extensive database, we included the following measures in our study: HAQ, SF-36, RADAI (patient's global assessment of disease and patient-assessed arthritis pain), radiologic score, and disease activity score (DAS 28) (swollen and tender joint count, blood sedimentation rate, and doctor's global assessment of disease) (38).

Health care utilization. Patients were assessed by telephone every 2 weeks for 12 weeks with a previously utilized and standardized method to measure health care utilization (27,29). Health care utilization included days of hospitalization, visits to a specialist or a general practitioner, emergency room visits, physiotherapy or other paramedical sessions, and the presence of help for the household. Thirteen patients were lost to followup.

Data analysis. To form subgroups of patients based on their pattern of scores on the INTERMED, hierarchical cluster analysis was applied. Cluster analysis is a nonparametric method by which patients are described in terms of the relative distances between them on a specified set of variables (39). Clusters were identified by calculating Euclidean distances and using Ward's method to form clusters, based on all 20 INTERMED variables (SPSS version 7.5 for Windows, SPSS, Inc., Chicago, IL). To determine the number of clusters that best describe the data, a scree plot analysis was conducted (39).

For descriptive purposes, clusters were compared on INTERMED variables and domains by Mann-Whitney U test, a nonparametric equivalent of the *t*-test. Differences on the remaining variables (sociodemographic data, severity of illness, functional status, and health care utilization) were tested by *t*-test for variables with approximately normal distributions, Mann-Whitney U test for nonnormal continuous variables, and chi-square tests for categorical data. To adjust for multiple testing, the significance level α was set on 0.01 for all tests (one-tailed).

Table 1. Comparison of the INTERMED scores between the 2 patient clusters

	Total sample*	Cluster 1*	Cluster 2*	Z	P
Biologic domain	6.5 ± 1.2	5.9 ± 0.9	7.1 ± 1.1	4.8	<0.01
Psychological domain	4.2 ± 2.5	2.3 ± 1.3	6.1 ± 1.9	6.8	<0.01
Social domain	2.7 ± 2.0	1.4 ± 0.8	3.9 ± 2.2	5.8	<0.01
Health care domain	3.8 ± 1.6	3.0 ± 1.0	4.7 ± 1.5	4.8	<0.01
Total score	17.2 ± 5.8	12.6 ± 2.3	21.9 ± 4.2	7.3	<0.01

* Mean ± SD.

RESULTS

Sample description. The majority of the patients were female (76%), married (80%), not employed (74.7%), and had at least one physical comorbidity (58.7%). The average age was 59 years (median 61.0), and the patients had a disease duration of about 13 years (median 10.5).

Hierarchical cluster analysis. Hierarchical cluster analysis resulted in a 2-cluster solution of a comparable size, differing in the same direction on all of the 4 INTERMED domains, with the most marked differences in the psychological domain and the total score (see Table 1). For the following 12 of the 20 variables, significant differences were found: severity of illness, current diagnostic profile, restrictions in coping, history of psychiatric dysfunction, current psychiatric symptoms, mental health threat, family disruption, social support, residential instability, social integration, intensity of treatment, and organizational complexity.

Comparison of the clusters. As illustrated in Table 2, comparison of the clusters on relevant sociodemographic and medical data revealed a tendency toward a higher proportion of complex cluster 2 patients receiving disability compensation (33.3% versus 10.8%, $P = 0.03$) and toward a longer duration of RA ($P = 0.09$). When clusters were compared for categorical duration of disease (less than 5 years, between 5 and 10 years, more than 10 years), differences did not reach statistical significance.

In Table 3, a comparison is made between clusters for severity of illness and functional status. Of the physician-rated severity of illness scores, none differed significantly. A significant difference did occur on the patient-rated severity of illness score (RADAI), and a nonsignificant tendency was seen on patient-assessed arthritis pain and patient's global assessment of disease. With regard to patient-rated functional

status, the clusters differed significantly on the HAQ (a patient self-reported disability scale) and on several scales of the SF-36, especially those related to physical functioning. Clustering of the INTERMED data demonstrated that complex patients differed with regard to self-assessment, but not with regard to physician-rated assessments, which supports the view that factors other than biologic factors may be responsible for how the patients live with their illness and how they utilize the health care system.

Comparison of the 2 clusters on health care utilization (see Table 4) revealed that almost none of the patients from cluster 1 were hospitalized or visited an emergency room during followup. In the complex cluster 2 population, 1 out of 4 patients (26.8%) were hospitalized and 1 out of 3 (29.0%) visited an emergency room. Complex cluster 2 patients also had more visits to medical specialists (3.0 versus 1.7), but they did not have significantly more visits to the general practitioner.

DISCUSSION

We assessed a representative sample of RA patients of a tertiary care center to test the hypothesis that the INTERMED is a robust and generic instrument that may help to identify patients with different degrees of case complexity and related health care needs. Two groups (clusters) of patients were identified, about half of them characterized as complex with high INTERMED scores in all domains. The 2 clusters differed significantly on subjectively assessed measures of health status but scored similarly on physician-rated measures. Although the physician- or laboratory-based measures of disease activity (e.g., DAS score, X-ray erosion score) were similar between the clusters, complex patients showed a slightly greater duration of disease and a significantly higher frequency of receiving disability compensation. Complex patients scored "worse" on the SF-36, especially on the sub-

Table 2. Comparison of relevant sociodemographic and medical data of the 2 clusters*

	Cluster 1	Cluster 2	P
Sex			
Male	28.9%	18.9%	0.31
Female	71.1%	81.1%	
Age, mean ± SD	60.8 ± 12.0	57.7 ± 11.9	0.27
Receiving disability compensation	10.8%	33.3%	0.03
Number of years since diagnosis, mean ± SD	10.7 ± 6.8	14.1 ± 8.6	0.09

* Differences between proportions were tested by the chi-square statistic, the remaining differences by *t*-tests.

Table 3. Comparison of physician-rated and patient-rated severity of illness and functional status between the 2 patient clusters*

	Cluster 1† (n = 31)	Cluster 2† (n = 31)	t	P
Doctor-rated severity of illness				
DAS 28 (0–10)	4.3 ± 1.2	4.8 ± 1.5	1.3	0.19
Doctor’s global assessment of disease (0–10)	3.1 ± 2.2	3.9 ± 2.7	1.2	0.25
Swollen joint count	5.1 ± 4.9	6.4 ± 4.0	1.2	0.23
Tender joint count	5.9 ± 5.2	9.3 ± 6.7	2.2	0.03
Blood sedimentation rate	27.3 ± 16.4	28.0 ± 20.7	0.2	0.89
Radiographic score of hands and feet, full (0–100%)	13.3 ± 17.8	19.8 ± 27.1	0.9	0.38
Patient-rated severity of illness				
RADAI (0–10)	3.1 ± 1.7	4.6 ± 2.3	2.9	0.01
Patient-assessed arthritis pain (0–10)	3.7 ± 2.4	4.9 ± 2.9	1.7	0.09
Patient’s global assessment of disease (0–10)	3.2 ± 2.4	5.0 ± 3.1	2.5	0.02
Functional status				
HAQ (0–3)	1.0 ± 0.7	1.7 ± 0.8	3.3	0.00
SF-36				
Physical functioning	51.7 ± 24.3	37.0 ± 26.3	2.3	0.03
Role—physical	57.4 ± 42.4	27.7 ± 38.1	2.9	0.01
Bodily pain	42.1 ± 6.6	44.1 ± 7.0	1.2	0.24
General health	43.6 ± 19.5	33.1 ± 16.2	4.5	0.00
Vitality	49.6 ± 18.1	31.1 ± 16.9	4.1	0.00
Social functioning	77.2 ± 18.3	58.9 ± 20.7	3.6	0.00
Role—emotional	65.7 ± 43.0	41.7 ± 43.1	2.2	0.03
Mental health	64.2 ± 7.8	62.0 ± 11.1	0.9	0.37
Physical component score	37.3 ± 8.2	30.2 ± 9.1	3.2	0.00
Mental component score	48.2 ± 6.3	43.3 ± 10.5	2.2	0.04

* DAS 28 = disease activity score; RADAI = Rheumatoid Arthritis Disease Activity Index; HAQ = Health Assessment Questionnaire; SF-36 = Medical Outcomes Study Short Form 36.
† Mean ± SD.

scores “general health” and “vitality,” had a higher HAQ score, and rated themselves as more severely ill and as having a lower functional status.

We have observed similar findings with the INTERMED in patients with chronic low back pain (27) and diabetes (29) and in patients admitted to internal medicine (40), supporting the observation that patients with the same disease and disease severity may differ with regard to the impact of the illness and their response to medical treatment (41). This observation is supported in this study by the significant differences in health care utilization between the complex and noncomplex patients. Because clusters did not differ with regard to disease severity, increased health care utilization of complex patients is most probably due to case complexity and psychosocial vulnerabilities. The 2 clusters differed in their number of hospitalizations, emergency room visits, and visits to spe-

cialists, but not in their consultations with the general practitioner. This pattern of health care utilization of complex patients, surpassing the framework of the primary care setting, could be interpreted as a prolonged psychosocial crisis, characterized by help-seeking behavior mobilizing more than the usual resources.

An important objective of the INTERMED is the allocation of patients to case management programs. In patients admitted to general internal medicine (42), a cutoff score of 21 was found to select patients who benefit from some form of case management. In the present study, 29% of the patients (22/75) had a score of at least 21. All of these patients were in the complex cluster and none were in the less complex cluster. Therefore, case management could be provided for complex patients identified with the INTERMED, while noncomplex patients could be treated with “standard care.”

In summary, the INTERMED identified distinct clusters of

Table 4. Comparison of health care utilization between the 2 patient clusters*

	Cluster 1	Cluster 2	P
Patients with at least 1 hospitalization	0.6%	26.8%	0.04
Patients with at least 1 emergency room visit	0.0%	29.0%	0.00
Number of visits to specialists, mean ± SD	1.7 ± 1.0	3.0 ± 1.9	0.01
Number of visits to the general practitioner, mean ± SD	1.4 ± 2.3	1.7 ± 2.5	0.83

* Differences in proportions were tested by the chi-square statistic, the other differences by Mann-Whitney U test.

patients with different degrees of case complexity and related health care needs. As these differences were mainly accounted for by the subjective impact of RA and correlated with increased disability, it underlines the fact that an effective therapeutic approach needs to include variables that are not conventionally assessed in the traditional medical history-taking. Such an approach detects patients who may benefit from psychosocial interventions or coordination of care. A problem-oriented and coordinated approach, based on comprehensive care needs assessment, might reduce costs and improve patients' well-being (4).

This study confirms that chronicity and disability of patients with RA is a phenomenon embracing biologic, psychological, social, and health care-related aspects. Because the INTERMED identified complex patients with a high level of disability and health care utilization, it could become a useful tool for clinical and scientific work with patients with RA. It complements the traditional clinical interview, is easy to use, is reliable across medical disciplines, and does not omit pertinent information compared with more time-consuming instruments (26). While existing instruments for RA focus on specific biologic aspects (e.g., the HAQ and the RADA) and leave out the psychosocial domains, others focus on specific psychiatric problems (e.g., the Hospital Anxiety and Depression scale) (43) and leave out the biologic and health care-related aspects of disease. Indeed, the SF-36 provides a broader picture of health, including emotional status, role functioning, anxiety, and depression (36,44), but it is self-assessed, and its score fluctuates depending on daily mood and physical symptoms and therefore lacks the stability for medical outcome predictions. Unlike psychometric instruments or scales measuring disease severity, the INTERMED also generates clinically relevant information for integrated treatment plans (27,29,40,42).

To prove the clinical utility of the INTERMED in RA, intervention studies (treatment based on INTERMED profiles versus standard care) will be needed. If such intervention studies show an increased treatment response for subgroups of complex patients, this could have major implications for the structural development of integrated and coordinated care for patients with RA and other chronic diseases.

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APPENDIX

The INTERMED scoring grid

	History	Current status	Prognosis
Biologic	Chronicity	Severity of illness	Complications and life threat
	Diagnostic complexity	Diagnostic complexity	
Psychological	Restrictions in coping	Resistance to treatment	Mental health threat
	Premorbid psychiatric dysfunction	Severity of psychiatric symptoms	
Social	Restrictions in social integration	Residential instability	Social vulnerability
	Social dysfunctioning	Restrictions of social network	
Health care	Intensity of prior treatment	Organizational complexity	Care needs
	Prior treatment experience	Appropriateness of admission or referral	

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Examples from the INTERMED scoring manual

1. Premorbid level of psychiatric dysfunction

- 0 No history of psychiatric dysfunction
- 1 A history of psychiatric dysfunction without clear effects on daily functioning
- 2 A history with a clear negative impact on daily functioning
- 3 A history of at least one psychiatric inpatient admission

2. Severity of current psychiatric symptoms

- 0 No psychiatric symptoms
- 1 Mild psychiatric symptoms (e.g., problems concentrating or feeling tense)
- 2 Moderate psychiatric symptoms (e.g., symptoms of anxiety or depression)
- 3 Severe psychiatric symptoms with notable behavioral disturbances (e.g., violence or behavior resulting in physical harm)

3. Residential instability

- 0 A stable housing situation and capability of independent living
- 1 A stable housing situation, but in need of support by others, or living in an institution
- 2 Expected changes in living situation
- 3 Homeless

4. Social vulnerability

- 0 No expected changes in living situation and no additional nonmedical care needs
- 1 No expected changes in living situation but additional nonmedical care needs
- 2 Temporary stay in a facility/institution after discharge
- 3 Permanent stay in a facility/institution after discharge

5. Care needs

- 0 Nonmental health care only (a primary care physician and a specialist)
- 1 Basic care (mentioned under 0) and in addition mental health care or simple forms of coordination of care
- 2 Specialist consults
- 3 Interdisciplinary case management including mental health care