

studied: patients fulfilling the ASAS criteria for axSpA, the modified New York criteria for AS and ASAS criteria for nr-axSpA.

Results: First TNFi treatment was initiated in 23,956 axSpA patients. Baseline characteristics of the pooled population are shown in the **Table**. The 12-month retention rate (95%CI) was 80% (79-80%); 71-94% across registries (**Figure**). At 6 months, overall ASDAS Inactive disease/BASDAI \leq 4 rates were: 33%/72% (LUNDEX adjusted: 27%/59%). Number of patients initiating 1st TNFi after 2009 and registered with fulfilment of axSpA (ASAS) was 6,097, Ankylosing Spondylitis (modified New York Criteria) was 2,935 and non-radiographic axSpA (nr-axSpA) was 1,178. We observed lower retention rate and marginally lower LUNDEX adjusted response rates in nr-axSpA patients (**Table**).

Table: Baseline characteristics, retention and response rates of all patients and the axSpA subgroups (ASAS criteria, modified New York criteria and nr-axSpA)

	All (n=6,097)		ASAS criteria* (n=2,935)		Modified New York criteria** (n=2,935)		nr-axSpA*** (n=1,178)	
	Available data, n	Median(IQR) or %	Median(IQR) or %	Median(IQR) or %	Median(IQR) or %	Median(IQR) or %	Median(IQR) or %	
Age, years	23,956	41 (33-50)	41 (33-50)	43 (34-52)	39 (31-48)			
Male	23,956	61 %	63 %	67 %	52 %			
HLA-B27-positive	12,388	68 %	76 %	69 %	68 %			
csDMARD	23,745	31 %	29 %	26 %	25 %			
Disease duration, years	18,939	2 (1-9)	2 (1-8)	3 (1-10)	1 (0-3)			
First TNFi drug								
Infliximab	6,874	29 %	19 %	20 %	16 %			
Etanercept	6,034	25 %	19 %	22 %	20 %			
Adalimumab	6,936	29 %	36 %	36 %	35 %			
Certolizumab	868	4 %	4 %	3 %	5 %			
Golimumab	3,244	14 %	23 %	20 %	24 %			
CRP, mg/L	18,382	10 (4-23)	13 (5-26)	13 (5-27)	7 (2-19)			
BASDAI, mm	14,351	60 (44-72)	64 (51-76)	66 (52-77)	65 (50-78)			
BASFI, mm	4,551	24 (10-40)	20 (10-40)	30 (10-50)	20 (10-30)			
BASMI	11,464	46 (26-66)	51 (33-69)	53 (34-70)	48 (29-68)			
Retention rates								
6 months (95% CI)	88 % (87-88%)		89 % (88-90%)		90 % (89-91%)		84 % (82-86%)	
12 months (95% CI)	80 % (79-80%)		81 % (80-82%)		83 % (82-85%)		73 % (70-76%)	
24 months (95% CI)	73 % (72-73%)		74 % (73-76%)		76 % (74-78%)		64 % (62-67%)	
Response rates								
	Crude****	LUNDEX adjusted****	Crude****	LUNDEX adjusted****	Crude****	LUNDEX adjusted****	Crude****	LUNDEX adjusted****
ASDAS inactive disease at 6 / 12 / 24 months	33% / 35% / 38%	27% / 24% / 19%	30% / 33% / 38%	25% / 23% / 18%	25% / 29% / 32%	21% / 21% / 16%	20% / 19% / 15%	20% / 19% / 15%
BASDAI \leq 4 at 6 / 12 / 24 months	72% / 75% / 77%	59% / 51% / 38%	73% / 76% / 79%	60% / 52% / 37%	71% / 73% / 76%	64% / 70% / 71%	50% / 43% / 29%	50% / 43% / 29%

Data are as observed, median (IQR) or percentage; csDMARD: conventional synthetic Disease Modifying Anti Rheumatic Drug; TNFi: tumor necrosis factor inhibitor; INF: infliximab; ETN: etanercept; ADA: adalimumab; CERT: certolizumab pegol; GOL: golimumab; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath Ankylosing Spondylitis Functional Index; BASMI: Bath Ankylosing Spondylitis Metrology Index; RASFI: Bath Ankylosing Spondylitis Functional Index; VAS: visual analogue scale; *Patients registered as having axial SpA according to Axial Spondylarthritis (ASAS) criteria, initiating treatment after 2009; **Patients registered as having Ankylosing Spondylitis (AS) according to New York Criteria, initiating treatment after 2009; ***Patients registered as having non-radiographic axSpA (nr-axSpA), initiating treatment after 2009; ****Crude value: The fraction responding of those still on drug at 6, 12 and 24 months, respectively; *****LUNDEX adjusted: crude value adjusted for drug retention

Conclusion: In routine care \approx 1/3 of patients with axSpA initiating 1st TNFi treatment were in ASDAS inactive disease after 6 months, while $\frac{3}{4}$ achieved BASDAI \leq 4. Four out of five patients continued treatment after 1 year. Results were slightly inferior in nr-axSpA as compared to AS.

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SAT0626 THE INFLUENCE OF MEDITERRANEAN DIET IN RHEUMATOID ARTHRITIS: A MONOCENTER CROSS-SECTIONAL STUDY

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Background: Mediterranean diet (MD) is considered a well-balance and potentially anti-inflammatory diet characterized by high consumption of olive oil, unrefined cereals, fresh or dried fruit and vegetables, fish, dairy, meat and with a moderate amount of red wine. Currently, there is conflicting data for the benefits of MD in RA, and no enough evidence to support a role of MD in the prevention and treatment of rheumatoid arthritis (RA) [1].

Objectives: The aim of our study was to evaluate the association between MD adherence and disease activity, general health (GH) and comorbidities in patients with RA.

Methods: Consecutive patients with RA (ACR/EULAR Criteria 2010) were enrolled in this cross-sectional study. For each patient, Disease Activity Score on 28 joints (DAS28), Simple Disease Activity Index (SDAI), patient GH and a self-reported questionnaire called MD score [2] were recorded. The association between MD score and the above mentioned variables was assessed through univariate regression models (MD score as response variable and the variables of interest as independent variables). Results from each model were reported in terms of: 1) test of association (Likelihood Ratio test, with a Chi-square distribution); 2) for categorical independent variables, estimated differences of mean MD score between groups, with respective 95% CI; 3) for numerical independent variables, estimate of correlation coefficient and regression slope coefficient, with respective 95% CI. All analyses were performed using the R software.

Results: 205 patients (197 Italian) were enrolled: median age at visit 53 (q1-q3: 44-59) years, age at onset 38 (q1-q3: 28-47), disease duration 12 (q1-q3: 7-19), female 80.49%, rheumatoid factor and/or anti-citrullinated protein antibody positivity 58.54%, radiographic damage 41.79%. Comorbidities were also assessed: gastrointestinal 19% (gastro-esophageal reflux disease; inflammatory bowel disease; gastritis; esophagitis), chronic renal failure 1%, arterial hypertension 21.95%, diabetes mellitus 3.9%, coronary artery disease 1.95%. A significant positive correlation was found between MD score and GH, as shown in the table below: this suggests a low/moderate tendency of having better GH with higher MD score. Although not statistically significant, a negative correlation was found with DAS28 and SDAI, suggesting an association between higher MD score with lower disease activity. Among comorbidities, a significant difference of mean MD score values between subjects with and without arterial hypertension was also found (mean difference -2.0 CI: -3.7, -0.2; p=0.029).

Numerical covariates	Mediterranean diet score		
	Correlation coefficient (r): est (95% CI)	Regression coefficient (slope): est (95% CI)	LR test: p-value
DAS28	-0.10 (-0.23, 0.04)	-0.45 (-1.05, 0.16)	0.149
SDAI	-0.12 (-0.25, 0.02)	-0.12 (-0.38, 0.15)	0.088
GH	0.19 (0.05, 0.31)	0.05 (0.01, 0.09)	0.007*
Body mass index	-0.05 (-0.18, 0.09)	-0.06 (-0.22, 0.08)	0.483

Conclusion: In this Italian RA cohort, the adherence to MD was significantly associated with a better GH, but higher MD score was not significantly associated with lower disease activity. Arterial hypertension was the only comorbidity associated with lower MD score, probably due to the fact that the prevalence of the other comorbidities was low. Our study suggests an overall beneficial effect of MD in RA patients. Further studies are needed to better understand the impact of lifestyle modification (e.g. diet) in achieving RA disease control.

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SAT0627 PSYCHOLOGICAL PROFILE IN PATIENTS WITH RHEUMATIC DISEASES IN CHINA: A STUDY OF HADS SELF-ASSESSMENT WITH SMART SYSTEM OF DISEASE MANAGEMENT (SSDM)

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Background: The patients with chronic diseases such as rheumatic diseases suffer from physical pain and/or disability. In addition, psychological morbidities have also been found in patients with rheumatic diseases. Hospital Anxiety and Depression Scale (HADS) is commonly applied to assess the mental health of patients with rheumatic disease.

Smart System of Disease Management (SSDM) is a mobile application which has two application systems for both patients and doctors for rheumatic diseases management. The patient application system provides functions including self-assessment, medication management, adverse events management and laboratory records. After input by patients, all the data will be synchronized to the mobile terminal of authorized rheumatologists. Based on these data, rheumatologists can evaluate and follow up with their patients and provide consultation service through SSDM in text or voice method. The rheumatologists can also adjust therapeutic regimens based on patients' profiles.

Objectives: The purpose of this study is to explore the profile of psychological morbidities in patients with rheumatic diseases.

Methods: The patients were educated and trained to perform HADS assessments using SSDM by the rheumatologists. The HADS self-assessments data could be extracted from the mobile terminal for further analysis. The HADS scale consists of two subscales for anxiety (HADS-A) and depression (HADS-D) which have 7 items, respectively. Both subscales range from 0 to 21, with higher scores indicating greater anxiety and depression. A score between 11 and 21 indicates a probable case of anxiety or depression.

Results: From June 2016 to January 2019, 13,830 adult patients (81% females; 19% males) with a mean age of 43.86 ± 17.29 years from 254 hospitals performed self-evaluation of HADS using SSDM. 34 rheumatic diseases were assessed, including RA (4,594; 33%), SLE (3054; 22%), SS (1,253, 9%), AS (975; 7%), gout (607; 4%), OA (590; 4%), MCTD (490; 4%), UCTD (443; 3%), PM/DM (405; 3%), etc.

Table 1 presents the number and percentage of patients with rheumatic diseases accompanied by anxiety or depression. The ratio of probable anxiety was 12% in RA, 14% in SLE, 15% in SS, 16% in AS, 10% in Gout, 11% in OA, 12% in MCTD, 14% in UCTD and 10% in PM/DM. The prevalence of probable depression was 19% in RA, 21% in SLE, 20% in SS, 21% in AS, 17% in Gout, 19% in OA, 21% in MCTD, 18% in UCTD and 16% in PM/DM.

Table 1. Prevalence of anxiety and depression in patients with rheumatic diseases

Disease	Frequency no. (%)	Age (years)		Anxiety (%)	Depression (%)
		Mean	SD		
RA	4,594 (33%)	51.17	18.72	12%	19%
SLE	3,054 (22%)	35.46	12.92	14%	21%
SS	1,253 (9%)	48.48	14.95	15%	20%
AS	975 (7%)	32.3	12.28	16%	21%
Gout	607 (4%)	44.57	16.35	10%	17%
OA	590 (4%)	50.25	15.22	11%	19%
MCTD	490 (4%)	43.28	14.92	12%	21%
UCTD	443 (3%)	38.02	12.68	14%	18%
PM/DM	405 (3%)	44.86	16.19	10%	16%
APS	200 (1%)	32.89	7.00	6%	9%
Scleroderma	201 (1%)	46.47	13.91	10%	20%
Vasculitis	163 (1%)	47.84	17.14	13%	17%
BD	134 (1%)	38.42	13.17	15%	16%
PsA	159 (1%)	40.34	12.7	10%	17%
Others	562 (4%)	42.18	15.35	11%	19%
Total	13,830 (100%)	43.86	17.29	12%	19%

Conclusion: SSDM can be used for HADS self-assessments by patients with rheumatic diseases. RA was recorded as the most prevalent condition, followed by SLE. 10% to 20% patients could be classified as probable case of anxiety or depression according to HADS scores. The prevalence of anxiety was usually lower than that of depression in patients with rheumatic diseases in this study.

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Validation of outcome measures and biomarkers

SAT0628 VALIDATION OF METHODS FOR PREDICTING LONG-TERM OUTCOME IN JUVENILE IDIOPATHIC ARTHRITIS: RESULTS FOR CANADIAN AND NORDIC PREDICTION MODELS IN THE NORDIC COHORT

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Background: Models predicting outcome in juvenile idiopathic arthritis (JIA) have recently been proposed by Guzman *et al.*¹ and Rypdal *et al.*² Guzman *et al.* constructed a model for predicting severe disease course derived from the ReACCh-Out study, and Rypdal *et al.* constructed models for prediction of non-remission, functional disability and joint damage.

Objectives: To validate methods for prediction of long-term outcome in JIA by testing the ability of Guzman's model and Rypdal's model to predict severe disease course (the ReACCh-Out outcome) in the Nordic cohort.

Methods: The Nordic cohort is a prospective longitudinal multicenter cohort from defined geographical areas of 4 Nordic countries. Children with a baseline and an 8-year study visit were included. Missing data were imputed using low rank matrix factorization³, and a K-medoids algorithm⁴ was used to identify clusters corresponding to severe disease course in the ReACCh-Out study. With this outcome, the prediction model of Guzman *et al.* was tested with no re-estimation of parameters. A Receiver operating characteristic (ROC) curve and the corresponding area

under the curve (AUC) were computed. For the same outcome, prediction models were built using the method of Rypdal *et al.* on randomly sampled training sets, and tested on disjoint validation sets.

Results: In the Nordic cohort 98/440 (22%) patients were identified with a severe disease course. This ratio is similar to the 125/610 (20%) found in the ReACCh-Out study. Characteristics of groups of patients with severe and non-severe disease course are similar in the two cohorts. The model of Guzman *et al.* had an AUC of 0.85 for prediction of severe disease course and an AUC of 0.66 for predicting remission off medication. In repeated cross-validations, the model of Rypdal *et al.* had a median AUC of 0.90 (IQR 0.86-0.92) for prediction of severe disease course, and a median AUC of 0.78 (IQR 0.72-0.82) for remission off medication.

Conclusion: Tests in the Nordic cohort validate the ability of the model of Guzman *et al.* to predict severe disease course. Repeated cross-validations of the model of Rypdal *et al.* indicate that validation results are highly dependent of the chosen outcome, and that prediction of long-term remission status is more challenging than prediction of a severe disease course.

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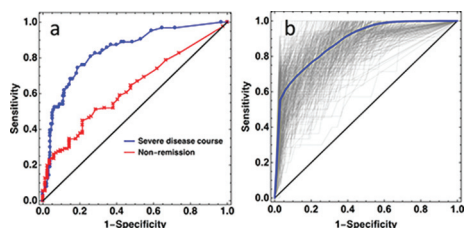


Figure. a. ROC-curves for Canadian model tested on Nordic JIA cohort. b. ROC-curves for the Nordic model tested on severe disease course.

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SAT0629 THERE ARE 4 MAIN QUESTIONNAIRES TO ASSESS ADHERENCE IN INFLAMMATORY ARTHRITIS BUT NONE OF THEM PERFORM WELL: A SYSTEMATIC LITERATURE REVIEW

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Background: Insufficient patient adherence to treatments in inflammatory arthritis (IA) including rheumatoid arthritis (RA), spondyloarthritis (SpA), psoriatic arthritis (PsA), crystal-induced arthritis and connective tissue diseases (CTD) may lead to complications, unnecessary treatment switches, and increased costs. Patient adherence to treatment should be assessed, however how to evaluate it has not been determined.

Objectives: To assess the psychometric properties of questionnaires to measure adherence to treatment in IA.

Methods: We performed a systematic literature review (SLR) using three central databases (Pubmed, Cochrane, Embase) and several websites in January 2019. The scope was limited to IA (i.e., RA, SpA, PsA, CTD, crystal-induced arthritis, vasculitis, and auto-inflammatory diseases), and disease-modifying drugs (i.e., mainly conventional DMARDs, biologics and targeted synthetic DMARDs). All questionnaires used to assess adherence were collected, then a specific search using the questionnaire name was run to obtain data on their psychometric properties including overall validity (sensitivity (Se), specificity (Sp) and Cronbach coefficient (CC), reliability, and sensitivity of change, following the OMERACT filter. These properties were analyzed semi-quantitatively.

Results: After screening 1209 publications and 194 other documents, 242 relevant papers were analyzed for measuring adherence (63.6% in RA, 8.7% in SpA, 6.6% in PsA, 14.5% in CIA and 19.0% in CTD). The number of articles using adherence questionnaires by disease was: 69/154 in RA, 14/21 in SpA, 27/40 in systemic lupus erythematosus (SLE), 9/16 in PsA, 8/35 in crystal induced arthritis and 4/6 in other CTD. Four questionnaires were used to evaluate drug adherence (Table1). The most used questionnaire was the MMAS in all diseases except in RA where the CQR was more used. The CQR was validated in 85 patients with IA against as external standard, electronic medication monitoring (Se 62 to 98%, Sp 67 to 97% and CC of 0.71 to 0.85). The MASRI was validated in 55 patients with SLE against adherence based on pharmacy refill information (Se 87%, Sp 86% and CC of 0.70). The MMAS was validated in 91 patients with gout against medication possession ratio Se 81 to 93%, Sp 44 to 53% and CC of 0.54). The MARS was validated in 108 patients with RA (Se 13 to 53%, Sp 57 to 94% and CC 0.60 to 0.75). Reproducibility was correct but copyright posed issues (Table).

Table 1. Questionnaires performances to assess adherence in IA

	Compliance Questionnaire on Rheumatology: CQR-19/5 ¹	Medication Adherence Report Scale: MARS10/9RA/6/5/4 ²	Medication Adherence Self-report Inventory: MASRI ³	Morisky Medication Adherence Scale: MMAS-8/4 ⁴
N studies on the questionnaire	48	13	7	62
Copyright	No	No	Yes	Yes
Reproducibility	++	++	+++	++
Validity	Yes	No	Yes	+/-
assessed in rheumatology				
Feasibility	+ /+++	+++	+++	+++

The + represents a semi-quantitative summary of the available literature with more + meaning higher/better results (from - to +++)

Conclusion: Four questionnaires are being used to measure medication non-adherence in IA; the most used is the MMAS which is unfortunately copyrighted and not fully validated in rheumatology. The CQR and MASRI questionnaires were the most validated in rheumatology, but the CQR is long and the MASRI only used for SLE. Thus it appears that to date, a simple, reliable and valid questionnaire to assess drug adherence is lacking.

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