(37,658) and discharge to inpatient facility, with respective HRs of 1.95 (95% CI, 1.28, 2.97), 1.34 (95% CI, 1.25, 1.43), 1.21 (95% CI, 1.01, 1.44) and 1.38 (95% CI, 1.30, 1.47). Lupus was not significantly associated with the risk of revision, mortality or hospital stay above the median (>3 days), the HRs were 1.10 (95% CI, 0.68, 1.78) and 0.95 (95% CI, 0.61, 1.47) and 1.06 (95% CI, 0.99, 1.13).

Conclusion: Lupus was associated with a higher risk of infection and transfusion and higher hospital charges post-primary THA. Insight into modifiable factors associated with these outcomes may improve outcomes in lupus patients undergoing THA.

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SAIOTA585

COMPARISON OF KNEE OSTEOARTHRITIS TREATMENT PATTERNS BY RHEUMATOLOGISTS VS. OTHER PROVIDERS IN A U.S. ADMINISTRATIVE CLAIMS DATABASE
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Background: Knee osteoarthritis (OA) is a painful, disabling condition with increasing prevalence.

Objectives: To compare characteristics and treatment patterns of patients newly diagnosed with knee OA by rheumatologists (RH) to those diagnosed by general practitioners (GP) and those diagnosed by orthopedic surgeons (OS).

Methods: U.S. administrative claims data from 2011-2018 (IBM Watson Health MarketScan® Research Database) was used to perform an observational cohort study. Inclusion criteria included >18 years and >1 claim with ICD9 lower-leg OA diagnosis prior to October 2015, followed by a confirmatory ICD10 knee OA diagnosis prior to October 2015. Each confirmed diagnosis was followed by >3 years of continuous enrollment without these diagnoses. Demographic characteristics and diagnosing physician specialty were assessed on index date, whereas comorbidity and treatment patterns were assessed during the variable post-index follow-up period. A two-sample t-test or a two-sample proportion test, where appropriate, was used to perform comparisons in GP vs RH and OS vs RH (P<0.05 considered statistically significant).

Results: 488,510 knee OA patients met inclusion criteria of which 76% (371,219) had physician type of interest noted on initial diagnosis claim. RH-diagnosed knee OA accounted for 3.2% (15,517), while GP and OS accounted for 20.2% (98,911) and 47.6% (232,567), respectively. The average age of patients diagnosed by RH and OS was less than those GP-diagnosed (RH, 58.9; GP, 63.4; OS, 58.9; RH vs GP, P<0.001; RH vs OS, P<0.001). There were more female patients in the RH- than GP- or OS-diagnosed group (RH, 75.6%; GP, 58.4%; OS, 58.9%; RH vs GP, P<0.001; RH vs OS, P<0.001). The RH-diagnosed group had significantly higher comorbidity burdens, as summarized by Deyo-Charlson Comorbidity Index (CCI) (RH, 1.53; GP, 1.40; OS, 1.01; RH vs GP, P<0.001; RH vs OS, P<0.001). The proportion of comorbid rheumatoid arthritis (RA) diagnoses was about 10-fold higher in RH-diagnosed patients, potentially indicating knee OA as an ancillary diagnosis noted on clinic visits for these patients (RH, 29.7%; GP, 3.8%; OS, 2.7%; RH vs GP, P<0.001; RH vs OS, P<0.001). RH-diagnosed patients received fewer total knee replacements (TKRs) (RH, 5.7%; GP, 9.3%; OS, 14.3%; RH vs GP, P<0.001; RH vs OS, P<0.001) and time to TKR initiation was significantly longer in RH- than GP- or OS-diagnosed patients (RH, 596.1 days; GP, 448.2 days; OS, 239.9 days; RH vs GP, P<0.001; RH vs OS, P<0.001). More RH-diagnosed patients received corticosteroids (CS) and hyaluronic acid (HA) with shorter initiation times than GP-diagnosed patients but OS diagnosed patients utilized HA and CS more than the shortest initiation times.

CS use: (RH, 73.0%, 109.6 days; GP, 62.3%, 122.5 days; OS, 74.3%, 84.7 days; RH vs GP, P<0.001; RH vs OS, P<0.001), HA use: (RH, 1.27%, 2277.5 days; GP, 14.3%, 2366.8 days; OS, 22.8%, 198.7 days; RH vs GP, P<0.001; RH vs OS, P<0.001). Furthermore, RH-diagnosed patients received more NSAIDS (RH, 58.1%; GP, 51.4%; OS, 53.9%; RH vs GP, P<0.001; RH vs OS, P<0.001) and opioids with >30-day supply (RH, 27.3%; GP, 23.5%; OS, 19.8%; RH vs GP, P<0.001; RH vs OS, P<0.001) than GP- or OS-diagnosed patients.

Conclusion: This descriptive claims analysis suggested that rheumatologists saw a considerable number of knee OA patients, with different characteristics to other providers, particularly females and those with co-occurring RA. Rheumatologist-diagnosed patients received the least number of TKRs, which may represent a higher CCI patient population not suitable for surgery. However, rheumatologists prescribed pharmaceutical therapies more than general practitioners. Further research into treatment patterns and characteristics of knee OA patients treated by rheumatologists is warranted.


SAIOTA586

THE INFLUENCE OF THE NEW PHARMACOLOGICAL AND NON-PHARMACOLOGICAL TREATMENTS ON SPONDYLOARTHRITIS ON WORK PARTICIPATION: A SYSTEMATIC REVIEW
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Background: The concept of spondyloarthritis (SpA) comprises several chronic inflammatory joint diseases. SpA patients can be distinguished as patients with predominantly peripheral SpA (pSpA) or with predominantly axial SpA (axSpA) according to their clinical presentation. AxSpA primarily affects the axial skeleton and the sacroiliac joints. Within axSpA patients, a subdivision based on the radiographic changes of the sacroiliac joints can be made: radiographic axSpA, which corresponds to ankylosing spondylitis (AS), and non-radiographic axSpA (nr-axSpA). SpA occurs typically in young and professionally active patients. Since 2000, important improvements have been made in the management of SpA, both on a pharmacological (introduction of biological disease-modifying antirheumatic drugs (bDMARD)) and a non-pharmacological (holistic approach) level. As a result of early diagnosis followed by adequate treatment, the majority of patients achieve a state of clinical remission allowing them to function without significant problems. However, many of these persons still experience problems such as exclusion clauses, additional premiums and even contract refusal when contracting private insurances because mostly risk assessments are solely based on historical data.

Objectives: The aim of this systematic literature review was to investigate whether the work participation of SpA patients with axSpA has significantly improved since the introduction of the bDMARD and the non-pharmacological treatment modalities. This would provide arguments for a more accurate and updated risk assessment of the expected personal and economic incapacity of axSpA patients by private insurance companies.

Methods: A systematic literature review from January 1997 until November 2017 was performed using Pubmed, Embase and Web of Science. Different search terms were used in each database: absenteeism, presenteeism, employment, sick leave, work disability and work participation. All studies assessing one of the search terms were analysed.

Results: In total, 33 studies out of 603 retrieved citations were included. Overall, the results were highly heterogeneous because of the different study designs and different use of definitions regarding work outcomes. Patients with AS were significantly confronted with restrictions on work participation compared to the general population before the availability of bDMARD. In addition, our literature review showed that, since the introduction of the bDMARD and the other non-pharmacological treatments, there is no evident improvement in work disability in AS patients. In contrast, a significant improvement of the observed presenteeism, presenteeism and work productivity. Only 6 studies included patients with nr-axSpA. In most of these studies a positive tendency towards work productivity was detected. In addition, contextual factors such as the type of job, support from employers and colleagues, adjustments in workplace, patient self-efficacy and exercise therapy were statistically significant predictive factors.
and personal behaviour were identified as important factors for work participation in these patients.

Conclusion: Most of the patients included in the selected studies had longstanding AS with significant structural damage. The great heterogeneity between the studies in patient populations, study design and evaluation methods impeded the formation of a uniform conclusion. However, since the introduction of the new treatment modalities, a positive tendency in work productivity in AS and nr-axSpA patients could be observed. More observational, cross-sectional and prospective studies are needed - especially in nr-axSpA patients - to evaluate the effect of both pharmacological and non-pharmacological treatment on the work outcome in SpA patients.

Disclosure of Interests: None declared


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**Epidemiology, risk factors for disease or disease progression**

**SAT0587**

THE ART OF IMPUTING MISSING DATA OF DISEASE AND FUNCTION ACTIVITY IN RHEUMATOID ARTHRITIS REGISTRIES

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**Background:** Large observational studies become more common in rheumatoid arthritis (RA). Disease registers [1] allow to analyse the effectiveness and safety of RA treatments in real-world populations, but observational studies suffer from missing data. To minimise bias, it has been shown that imputing missing data is superior to the use of complete case analysis [2]. Although some imputation methods have been studied in clinical trials of rheumatic diseases [3] and in small registers [4], the various imputation techniques have never been systematically compared in large registers.

**Objectives:** To compare the effects of available imputation methods on the estimated values and on RA remission rate for missing disease activity measures in large registers.

**Methods:** We used 1000 patients with complete data for disease activity (Disease Activity Score (DAS28)) and Clinical Disease Activity Index (CDAI) at baseline (treatment initiation), 6, 12, and 24 months after initiation of abatacept or a tumor-necrosis factor inhibitor (TNFi) from an existing register collaboration (PANABA).

Simulation procedure: Values were deleted randomly and imputed with three types of imputation methods: (1) methods imputing forward in time, such as Last Observation Carried Forward (LOCF) or Linear Forward Extrapolation (LFE); (2) methods considering data both forward and backward in time, such as Nearest Available Observation (NAO), Linear Extrapolation (LE) or Polynomial Extrapolation (PE); and (3) methods using computer-intensive multi-individual imputations, such as Linear Mixed Effects cubic regression (LME3) and Multiple Imputation by Chained Equation (MICE).

We conducted a simulation study by performing this procedure 1000 times and computing the mean difference between the true and the imputed values, and between the true remission rate (CDAI and DAS28) and the imputed ones.

**Results:** Results are summarised in Fig. 1. At baseline, all methods underestimated the true values by at least 20%. Despite this, LME3 and MICE were able to provide estimates of baseline remission rates with less than 3% of error. For follow-up data, missingness at 6, 12, or 24 months, NAO, LE and PE led to relative bias of the mean values ≤15%, and almost unbiased remission rate. LOCF and LFE respectively over and underestimated the mean imputed values up to 20%, leading respectively to a non-negligible under and over-estimation of the remission rate. Although LME3 and MICE had low bias in estimating the mean values, they narrowed the distribution of the imputed values and thus strongly underestimated remission rate.

**Conclusion:** When imputing disease activity in rheumatoid arthritis register data, researchers should prefer Linear Mixed Effects cubic regression (LME3) for baseline and nearest available observation (NAO) for follow-up data.

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**SA0588**

COMPARATIVE EFFECTIVENESS RESEARCH IN OBSERVATIONAL SETTINGS: EVALUATING TWO NEW METHODS TO ANALYSE RESPONSE RATES

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**Background:** Researchers typically report the proportion of patients reaching a defined clinical threshold (e.g. EULAR response, low disease activity (LDA) rates) after a set time. Comparing response rates (%) in observational settings is hampered by two major threats, 1. Confounding: Patient, disease, and treatment characteristics often differ for each drug. 2. Attrition bias: Assessing %rr after a set time excludes patients who discontinued their treatment, which may overestimate drug effectiveness. Currently, no proposed method accounts for both confounding and attrition.

**METHODS TO ANALYSE RESPONSE RATES**

Comparison of two new methods to analyse response rates. Fig. 1: Mean imputed DAS28 and DAS28 remission rate. Plain lines are the true values.

**Result:** In a post-hoc comparison of different methods, both quantitative and qualitative differences were observed. In summary, the new methods seem to provide more accurate and reliable estimates of response rates in observational settings.