UiA Universitetet i Agder | AURA

Accepted manuscript

Berg, K. H., Rohde, G., Prøven, A., Benestad, E. E. P., Østensen, M. & Haugeberg, G. (2019). Sexual Quality of Life in Patients with Axial Spondyloarthritis in the Biologic Treatment Era. *The Journal of Rheumatology, 46*(9), 1075-1083. https://doi.org/10.3899/jrheum.180413.

Published in:	The Journal of Rheumatology
DOI:	https://doi.org/10.3899/jrheum.180413
AURA:	https://hdl.handle.net/11250/3043396
Copyright: © 2019 The Journal of Rheumatology

This is a pre-copyediting, author-produced PDF of an article accepted for publication in The Journal of Rheumatology following peer review. The definitive publisher-authenticated version Berg, K. H., Rohde, G., Prøven, A., Benestad, E. E. P., Østensen, M. & Haugeberg, G. (2019). Sexual Quality of Life in Patients with Axial Spondyloarthritis in the Biologic Treatment Era. The Journal of Rheumatology, 46(9), 1075-1083 is available online at: https://www.jrheum.org/content/46/9/1075.

Accepted Article

Sexual quality of life in patients with axial spondyloarthritis in the biologic treatment era

[1] [1,2] [3] [1] [2] [2,4]

Kari.Hansen. Berg Gudrun Rohde, Anne. Prøven , Esben. Esther. Pirelli. Benestad , Monika. Østensen , Glenn. Haugeberg

[1] [2]

Faculty of Health and Sport, University of Agder, Norway. Departement of Rheumatology, Sorlandet Hospital HF, Kristiansand,

[3] [4]

Department of Rheumatology, Martina Hansens Hospital, Bærum, Department of Neuroscience, Division of Rheumatology,

Norwegian University of Science and Technology, Trondheim, Norway

Kari Hansen Berg (Corresponding Author),

PhD student and Head of Institute of Nursing Sciences

Faculty of Health and Sport, University of Agder, Norway

Postbox 422,

4604 Kristiansand

Phone: 0047 93037669

E-mail: kari.h.berg@uia.no

Gudrun Elin Rohde

Professor

Faculty of Health and Sport, University of Agder, Norway and Department of Clinical research, Hospital of Southern Norway Trust, Kristiansand, Kristiansand, Norway

E-mail: Gudrun.e.rohde@uia.no

Anne Prøven

MD

Department of Rheumatology,

Downloaded on January 13, 2023 from www.jrheum.org

This article has been accepted for publication in The Journal of Rheumatology following full peer review. This version has not gone through proper copyediting, proofreading and typesetting, and therefore will not be identical to the final published version. Reprints and permissions are not available for this version. Please cite this article as doi 10.3899/jrheum.180413. This accepted article is protected by copyright. All rights reserved.

Accepted Article

Martina Hansens Hospital, Bærum, Norway

E-mail: anne.proven@mhh.no

Esben Esther Pirelli Benestad

Professor

Faculty of Health and Sport, University of Agder, Norway

E-mail: esben.esther@uia.no

Monika Østensen

Professor Emeritus

Division of Rheumatology, Department of Medicine, Hospital of Southern Norway Trust, Kristiansand, Norway

E-mail: monika.ostensen@gmail.com

Glenn Haugeberg

Professor at NTNU

Division of Rheumatology, Department of Medicine, Hospital of Southern Norway Trust, Kristiansand, Norway

and Department of Neuroscience, Division of Rheumatology, Norwegian University of Science and Technology, Trondheim, Norway

E-mail: glenn.haugeberg@sshf.no

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

Abstract

Objective: To explore the relationship between demographic, disease related variables, treatment and sexual quality of life (SQOL) in men and women with Axial Spondyloarthritis (ax-SpA).

Methods: Ax-SpA patients were consecutively recruited from two rheumatology outpatient clinics in Sothern Norway. A broad specter of demographic, disease, treatment and quality of life data were systematically collected. SQOL was assessed using the SQOL-F questionnaire (score range 18-108). Appropriate statistical tests were applied for group comparison and the association between independent variables and SQOL-F was explored using multiple linear regression analysis.

Results: A total of 360 (240 men, 120 women) ax-SpA patients with mean age 45.5 years and disease duration 13.9 years were included. Seventy-eight percent were married/cohabiting, 26.7% were current smokers, 71.0% were employed, 86.0% performed > 1-hour exercise per week and 88.0% were HLAB27 positive. Mean (SD) values for disease measures were: C-reactive protein (CRP) 8.5 (12.1) mg/L, BASDAI 3.1 (2.1), BAS-G 3.8 (2.5), BASFI 2.7 (2.2) and HAQ 0.6 (0.5). The proportion of patients using nonsteroidal anti-inflammatory drugs was 44.0%, synthetic disease-modifying antirheumatic drugs (DMARDs) 5.0% and biologic DMARDs 24.0%. Mean (SD) total sum score for SQOL was 76.6 (10.9).

In multivariate analysis female gender, increased BMI, measures reflecting disease activity (BAS-G and CRP) and current biologic treatment were independently associated with a lower SQOL.

Conclusion: Our data suggest that inflammation in ax-SpA patients even in the biologic treatment era has a negative impact on SQOL.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Background

Axial Spondyloarthritis (ax-SpA) is a chronic, systemic inflammatory rheumatic disease affecting the axial skeleton (1). Ax-SpA most often has its onset in early adulthood which is an important time in life where most people start relationships and prepare for and start their career (2). The nature of the disease may affect quality of life (QOL) (3). QOL is a broad concept which is both subjective and multidimensional, and has psychological, social and spiritual dimensions (4). The physical and psychological consequences of a chronic disease such as ax-SpA may influence all dimensions of QOL, including sexual function and sexual perception in a lifelong perspective. Sexual QOL (SQOL) is not clearly defined in the literature, however it includes the relationship between sexual dysfunction and QOL (3, 5). Sexual activity and enjoyment are components of the physical and psychological dimensions of QOL. Furthermore, sexual activity as part of reproduction is considered to be one of the key functions of human beings with its impact on QOL. According to WHO sexual health is defined as a state of physical and emotional, mental and social-wellbeing in relation to sexuality (6).

The literature has mainly focused on dysfunction or sexual problems (7-9). In the present study we aimed to focus on the quality and patients' perception of SQOL exploring the relationship between SQOL and demographic, disease related variables and treatment in men and women with ax-SpA.

Methods:

Patient recruitment

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

The ax-SpA patients included in this cross-sectional study was consecutively recruited when visiting the outpatient rheumatology clinics at Martina Hansens Hospital (MHH) and Sorlandet hospital (SSHF). To be included the patients had to be 18 years or older and fulfill the Assessment of SpondyloArthritis (ASAS) criteria for ax-SpA (10). Patients had to be in a physical and mental condition capable to give confirmed consent, and understand written and vocal Norwegian language

Data collection

As listed in table 2 a broad specter of demographic characteristics, disease, treatment and QOL data was systematically collected partly by use of patient questionnaires, direct interview, by physical examination and laboratory tests. Demographic data included age, gender, body mass index (BMI), smoking (current smoker, previous smoker and non-smoker), alcohol consumption (never, 1-6 glass, 7 glasses or more), education (education < 10 years, 11-13 years and > 13 years), work status (employed and non-employed) and physical exercise (< 1 h/week and > 1 h/week). Previous smoker and non-smokers were considered as non-smokers. Disease duration was defined as the time between the date fulfilling the ASAS criteria for ax-SpA and the date for inclusion in the study. HLA-B27 status was registered. Data on comorbidities were recorded by nurse interview and by reviewing medical records and included: cardiovascular diseases, pulmonary diseases, neurological disorders, endocrine disorders, hematological disorders, gastro-intestinal disorders, urogenital disorders, peripheral arthritis, cancer and mental disorders were reported, and integrated into a sum score to reflect comorbidity.

Disease activity was assessed by the Bath Ankylosing Spondylitis Activity Index (BASDAI), 68 tender and 66 swollen joint counts, the Maastricht Ankylosing Spondylitis Enthesitis Score (MASES), and C-reactive protein (CRP). Physical function was assessed by Bath

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Ankylosing Spondylitis Functional Index (BASFI) and the Health Assessment Questionnaires (HAQ). To measure damage, the Bath Ankylosing Spondylitis Metrology Index (BASMI) was used. Data on Bath Ankylosing Spondylitis Patients Global Score (BAS-G) and morning stiffness was also collected. Current medication including nonsteroidal anti-inflammatory drugs (NSAID), synthetic disease-modifying antirheumatic drugs (sDMARDs) and biologic DMARDs (bDMARDs) was registered.

Health-related quality of life (HRQOL) was assessed by SF-36 (short form 36), which is a self-reported and generic questionnaire assessing 8 domains: general health, bodily pain, physical function, role limitations (physical), mental health, vitality, social function and role limitations (emotional). The eight domains can be combined into a physical and mental sum scale that reflects physical and mental health. The physical component summary (PCS) and the mental component summary (MCS) scales were used in this study (11).

SQOL was assessed using the generic Sexual Quality of Life-Female (SQOL-F) questionnaire developed to explore the relationship between female SQOL (5). A modified version of SQOL-F was also used for men(12). SQOL-F can also be used on partners with minor modifications (5). In our study, we changed the fourth question to “When I think about my sex life, I feel less of a woman/man”. The questionnaire was translated into Norwegian by MAPI Research Institute in 2006. SQOL consists of 18 items, rated on a six-point response scale: completely agree, moderately agree, slightly agree, slightly disagree, moderately disagree, completely disagree. The response categories are scored 1-6 giving a total score range of 18-108. A higher score indicates better SQOL (5). In this paper we also have used sub-scores, identified and validated by Maasoumi, based on Symonds SQOL-F questionnaire, which reflects various aspects or dimensions of SQOL as shown in table 1 (3). For the single patient data were collected at the same day.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Table 1

Statistical analyses:

Statistical analyses were performed using IBM SPSS Statistics (IBM Corp., Armonk, NY, USA (version 24). Continuous variables are presented as the mean with standard deviation (SD) and categorical variables as numbers and percentages (%). For group comparison we used Chi-square for categorical variables, and independent t-test and Pearson's correlation for continuous variables.

Linear regression analysis, general linear model (GLM), in SPSS was used to examine the univariate/unadjusted and adjusted association between demographic- and disease-related variables and SQOL (SQOL-F) total score and for sub-scores. The independent variables in the multiple analyses were chosen based on $p < 0.1$ in the univariate analyses (demographic, co-morbidity, disease activity measures, health status and current treatment in table 2), and also adjusted for age and gender. Analyses were also performed with and without the HRQOL SF-36 measures in the model.

In the final multivariate model, we included demographic variables, disease activity (assessed by BASDAI and MASES scores), health status (assessed by HAQ, BASFI, and BAS-G scores), damage (assessed by BASMI score), co-morbidity and treatment center. For robustness, we also tested the multiple regression models by using forward and backward procedure. Cronbach's alphas test was used to explore the reliability of the SQOL-F questionnaire with its total score and its sub-scores. The level of significance was set at $p < 0.05$.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Ethical and legal aspects

The study was approved by the Regional Committee for Medical Research Ethics in Norway (REK #: 4.2007.2152). All patients gave written informed consent before inclusion.

Results

Demographic and disease related characteristics

A total of 389 ax-SpA patients were consecutively recruited at the two participating rheumatology outpatient clinics. Among them 29 patients (MHH 10 and SSHF 19 patients) did not answer the SQOL-F questionnaire. The significant difference between responders and non-responders on SQOL were that responders had a higher consumption of alcohol ($p = 0.033$), were more often employed ($p = 0.003$), exercised more ($p = 0.038$) and were more often cohabitant ($p < 0.001$).

Cronbach's alphas in our study expressing reliability of the test was 0.75 for the SQOL-F total score, 0.91 (excellent) for Psychosexual Feelings, 0.82 (good) for Sexual and Relationship Satisfaction, 0.82 (good) for Self-Worthlessness and 0.60 (questionable) for Sexual-Repression.

A statistical significant difference for mean (SD) between patients at MHH ($n = 246$) and SSHF ($n = 114$) was found for BASDAI (2.9 (2.0) vs. 3.6 (2.0), $p = 0.02$), BAS-G (3.6 (2.5) vs. 4.3 (2.6), $p = 0.015$), MASES (2.4 (2.9) vs. 4.9 (4.76), $p < 0.001$) and the sum score of comorbidities (0.8 (1.0) vs 0.4 (0.7), $p < 0.001$). Furthermore, more MHH patients than SSHF patients were treated with bDMARDs (29.7% vs 9.0%, $p < 0.001$). For HQOL, measured by SF-36, a statistically significant better PCS was found among MHH patients compared to SSHF patients (40.7 (9.1) vs. 37.9 (9.8), $p = 0.011$). For the other variables listed in table 2,

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

no significant differences were seen between the two centers. For the present analysis the results are presented as pooled data from both hospitals and adjusting for center in multivariable analyses.

In table 2 data is shown for all ax-SpA patients (n = 360) included in the SQOL analyses and for men (240) and women (120) separately. The mean age for all patients was 45.5 (11.9) years; 67.0% were men and 33.0% women, 78.0% were married or cohabiting and 86.0% reported exercising > 1 hour per week. Mean (SD) values for disease measures were as follows: BASDAI 3.1 (2.06), MASES 3.2 (3.67), BASFI 2.7 (2.21), BAS-G 3.8 (2.53) and HAQ 0.6 (0.49). Among patients, 88.0% were HLA-B27 positive, current user of NSAIDs was 44.0%, of sDMARDs 5.0% and of bDMARDs 24.0%. Only 3 patients treated were concomitantly treated with bDMARDs and sDMARDs. When comparing men and women with ax-SpA (shown in Table 2), women had a significantly lower BMI (25 4 (4.4) vs. 27.5 (4.5) kg/m^2, $p < 0.001$). Women had a higher MASES scores (4.5 (3.8) vs. 2.5 (3.4), $p < 0.001$), lower BASMI (2.0 (1.6) vs. 2.6 (2.2), $p = 0.005$) and higher HAQ (0.6 (0.5), $p = 0.025$) vs. 0.5 (0.5), $p = 0.025$). For the other variables listed in table 2, no statistically significant differences were found between men and women, including HRQOL measures.

Bivariate correlation between demographic and clinical background variables showed a strong correlation ($r = > 0.5$) between age and disease duration ($p < 0.001$), morning stiffness and BASDAI ($p <0.001$), morning stiffness and MASES ($p = 0.045$), BASFI and BASDAI ($p <0.001$), BASDAI and BAS-G,HAQ, PCS and MCS ($p <0.001$), BASFI and BAS-G, HAQ, PCS and MCS ($p <0.001$), BAS-G and MASES ($p <0.001$), and HAQ and MASES ($p <0.001$).

Furthermore, we identified moderate correlation ($r = 0.3 – 0.5$) between age and sum comorbidity ($p < 0.001$), work and sum comorbidity ($p < 0.001$), work and BASFI ($p <$

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

0.001), HAQ and PCS ($p < 0.001$), work and sum comorbidity ($p < 0.001$), work and BASFI ($p < 0.001$), BASMI and disease duration ($p < 0.001$), BASMI and BASFI ($p < 0.001$), BASFI and morning stiffness ($p < 0.001$), BASDAI and MCS ($p < 0.001$). Weak- and negligible correlations are not shown.

Table 2

Sexual quality of life data

Total SQOL score and sub-scores for domains for all patients and for men and women separately are shown in table 3. When comparing SQOL between MHH and SSHF, patients from MHH reported lower sub-scores for psychosexual feelings (32.6 (8.7) vs. 34.7 (7.4), $p = 0.019$), self-worthlessness (15.3 (3.6) vs. 16.2 (2.8), $p = 0.005$) and sexual repression (14.9 (3.8) vs. 16.0 (3.3), $p = 0.004$) and higher sores for sexual and relationship satisfaction (13.4 (6.2) vs. 10.8 (4.4), $p < 0.001$).

As shown in table 3, compared to men women reported a significantly lower SQOL sum score (74.7 (11.9) vs. 77.6 (10.9), $p = 0.026$) and a lower score for sexual repression (14.4 (4.1) vs. 15.6 (3.4), $p = 0.005$), whereas for the other sub domains in SQOL, no significant differences were found between the genders.

Table 3

Unadjusted association between demographic and disease-related variables and SQOL

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

In table 4 univariate/unadjusted associations are shown for SQOL-F sum score and for SQOL-F sub scores. As shown employment status, increased comorbidity score, BADAI, BASMI, morning stiffness, BASFI, BAS-G, HAQ, CRP and bDMARDs was associated with reduced SQOL-F score whereas male gender and the SF-36 scores PCS and MCS was associated with a higher SQOL score. The results for the SQOL-F sub scores can be depicted from table 4.

Table 4

Adjusted associations between demographic- and disease-related variables and SQOL

In the multivariate analyses presented in table 5 (without SF 36 measure in the model) male gender (B = 4.2, p = 0.014), low BMI (B = -0.4, p = 0.034), low CRP (B = -0.15, p = 0.026) low BAS-G (B = -1.7, p = 0.002) and non-use of bDMARDs (B = 6.4 , p < 0.001) were independently associated with a higher SQOL total score. Male gender (B = 2.44, p = 0.045), low BMI (B = -0.29, p = 0.015), low BAS-G (B = -1.36, p < 0.001) and non-use of bDMARDs (B = 3.91, p = 0.003) were independently associated with high scores on psychosexual feelings. Living alone (B = 3.11, p < 0.001) and high BAS-G (B = 0.65, p = 0.016) were independently associated with high score on sexual relationship satisfaction. Male gender (B = 1.11, p = 0.027), low BMI (B = -0.11, p = 0.021), low CRP (B = -0.05, p = 0.015) low BAS-G (B = -0.49, p = 0.002) and non-use of bDMARDs (B = 1.89, p < 0.001) were independently associated with high score on self-worthlessness. Low age (B = -0.05, p = 0.014), male gender (B = 1.37, p = 0.012), low CRP (B = 0.05, p = 0.017), low BAS-G (B = -0.42, p = 0.01 and non-use of bDMARDs (B = 1.17, p = 0.044) were independently

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

associated with high sexual-repression. The demographic- and disease-related variables included in the multiple analyses explained 16.5 % of the variance in SQOL-F sum, 16.7% in psychosexual feelings, 9.7% in sexual relationship satisfaction, 16.9 % in self-worthlessness and 16.3% in sexual-repression. The same pattern of associations was seen when the multivariate model was performed with forward and backwards procedure (data not shown). Further only minor differences in the results were seen when SF36 measures were included in the model (data not shown).

Table 5

Discussion

The main findings of our study are that SQOL is impaired in patients with active ax-SpA indicated by association with elevated BAS-G and CRP. Further use of bDMARDs was also associated with impaired SQOL. Among demographic variables we found that female gender and increased BMI were independently associated with impaired SQOL.

Minor differences between genders were identified with men reporting approximately a 3% higher total score on SQOL than women. Except for a higher score for sexual repression in men, no significant differences between the genders were found for the other subcategories. As in other studies, men are more likely to report feeling positively about their sexual life, self-confidence in their ability to perform well in a sexual relationship and having a value as a sexual partner (3, 5).

Depression analysis was not performed in our study, but the SF36 summary scales MCS and PCS show no significant differences in MCS between men and women. Several factors may

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

contribute to lower SQOL in women, one being lower self-confidence. An increased BMI can lead to low self-confidence (13), because women experience increased BMI worse than men (14). Differences between genders in the clinical presentation of ax-SpA, such as more fatigue and enthesitis in women may also play a role (15, 16). In our study women reported more enthesitis than men and may have suffered more pain from enthesitis causing a negative effect on SQOL. Studies in patients with SpA (17) and RA have also found a greater impact of disease symptoms on sexual activity in female patients (16). Furthermore women and men are different in how they present their health status and communicate their health problems (18). This may influence the way they are answering questionnaires. In contrast to our results, van Berlo et al. observed in a study with RA patients a stronger correlation between sexual problems, physical health and disease activity in men than in woman, but there were no gender differences regarding sexual satisfaction (19). Differences observed between studies may partly be explained by various levels of disease activity, which in general was low in our study.

An increased level of CRP reflecting inflammatory activity was negatively associated with total SQOL and with two of four subscales: Self-worthlessness and sexual repression. BAS-G was the only self-reported disease variable significantly associated with SQOL indicating that ax-SpA may have a marked negative influence on wellbeing and SQOL. High disease activity may make the patient lose confidence as a sexual partner and feel less attractive as woman or man. Grief and shame over being disabled may raise feelings of guilt or resentment which also could strain the relationship (5, 16). However, in our study BASMI, mainly reflecting organ damage of the spine, was significantly higher in men than in women (2.6 vs 2.0, respectively) indicating a higher damage score in men compared with women.

In our study, current use of bDMARDs was independently associated with a negative total SQOL-F score and the SQOL-F subscale scores, except Sexual Relationship Satisfaction.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Good disease control achieved by bDMARDs has been reported to have positive impact on both physical and psychological outcomes in both ankylosing spondylitis (AS) and ax-SpA patients (20-22). bDMARDs were used by 24% of the patients in our study but only by 11.6% in the study by Healey et al. (20). In our study fewer female than male patients used bDMARDs (18% in women and 26% in men). One explanation may be that the indication for prescribing anti-TNF treatment was first approved for patients with radiological ax-SpA, AS, a disease with male predominance. Later on, the indication for anti-TNF treatment also included patients diagnosed with non-radiographic ax-SpA, which has a more equal gender distribution than AS (23, 24). In our study, current use of bDMARDs was independently associated with a negative total SQOL-F and the SQOL-F subscales except for Sexual Relationship Satisfaction. This is most likely explained by the cross-sectional study design which does not allow for drawing conclusion about causality. In the present study the use of bDMARDs might be a marker of disease activity and not reflect a causal negative effect of bDMARDs on SQOL.

Our patient population differed from other studies regarding disease activity and comorbidities such as cardiovascular diseases, diabetes mellitus, osteoporosis and depressive disorders (25). In a previous study exploring perceived effect of health status on sexual activity in our ax-SpA cohort, the majority of patients (82%) reported that their health status had no or insignificant effects on their sexual life (26), reflecting low disease activity and low burden of comorbidities (less than one per patient) in our patients.

In our study, high BMI was independently associated with a low total SQOL score and with the subdomains “Psychosexual feelings” and “Self-worthlessness”. Our study is in line with previous studies reporting higher BMI as negatively associated with several aspects of quality of life in AS patients (27). A high BMI may induce a negative body image reducing sexual activity and impairing sexual quality of life particularly in women (14, 27, 28). In a recent

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

report we found that female gender, high BMI, current smoking, and reduced HRQOL were independently associated with health status and a large negative effect on sexual activity (26). As expected, living alone was negatively associated with sexual and relationship satisfaction. Our results indicate that both physical (e.g. BMI) and social factors (e.g. living alone) exert an influence on SQOL when combined with disease characteristics like the presence of inflammation.

Weakness and strength

The strength of our study was the high response rate (97% of surveyed) to answering questions addressing SQOL exceeding the rate in other studies (29). Patients of both genders were consecutively recruited, and there were few exclusion criteria which indicate a good internal validity of the study. At one outpatient clinic (SSHF) we have previously reported minor differences between the included and not included ax-SpA patients examined for both demographics and disease measures (26).

Data were collected at two hospitals, which can be considered both a strength and a weakness. A strength is that both hospitals follow the Treat-to Target (T2T) strategy aiming to reach low disease activity or remission (30). The study used a cross-sectional design and did not permit any causal interpretation; therefore, we can only establish associations between dependent and independent variables. The patients were recruited in a hospital setting and may therefore have suffered from more severe diseases than a community-based sample. A major limitation of the study is that the patient cohort was not compared with healthy controls. Sexual activity and enjoyment are complex phenomena to explore, which ideally should be measured using several items to capture various aspects of SQOL (31). Furthermore, lack of data on radiological damage, hip involvement and replacements and standardized assessment of fibromyalgia tender points might be considered as limitations.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Conclusion:

Our study indicates that SQOL is lower in females and in ax-SpA patients with active disease shown by elevated BAS-G and CRP. The use of bDMARDs was also independently associated with a lower SQOL score possibly reflecting bDMARD treatment in this cross-sectional study as a marker of ax-SpA disease activity and not causality between bDMARDs use and impaired SQOL. Thus, we believe that our data indicate that good disease control suppressing inflammation may improve SQOL in ax-SpA patients. The association between increased BMI and low SQOL should encourage patients to change their life style which then may improve SQOL. It is also to be emphasized that our goal in clinical practice is not only to treat inflammation but to take care of the whole patient and address their needs including SQOL. Long term observational follow up studies of ax-SpA patients exploring the impact of disease on SQOL are needed to investigate changes over time.

Acknowledgements: We appreciate the expert technical assistance and help with data collection provided by the nurses at SSHF and MHH. We also thank statistician Are Hugo Pripp at the Unit for Biostatistics and Epidemiology, Oslo University Hospital for help with the statistics. The study was funded by a research grant from Health Southern Norway Regional Trust and partly by Sørlandet Hospital and Martina Hansens Hospital.

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

References

1. Bal S, Bal K, Turan Y, Deniz G, Gürgan A, Berkit IK, et al. Sexual functions in ankylosing spondylitis. Rheumatol Int 2011;31:889-94.
2. Ostensen M. New insights into sexual functioning and fertility in rheumatic diseases. Best Pract Res Cl Rh 2004;18:219-32.
3. Maasoumi R, Lamyian M, Montazeri A, Azin SA, Aguilar-Vafaie ME, Hajizadeh E. The sexual quality of life-female (sqol-f) questionnaire: Translation and psychometric properties of the iranian version. Reprod Health 2013;10:25.
4. Spilker B, editor. Quality of life and pharmacoeconomics in clinical trials. 2nd ed. Philadelphia: Lippincott-Raven; 1996.
5. Symonds T, Boolell M, Quirk F. Development of a questionnaire on sexual quality of life in women. J Sex Marital Ther 2005;31:385-97.
6. World Health Organization. Sexual health. [cited 25.09.2018]; Available from: http://www.who.int/topics/sexual_health/en/.
7. Akkurt HE, Yilmaz H, Yilmaz S, Parlak L, Ordahan B, Salli A. Evaluation of sexual dysfunction in females with ankylosing spondylitis. Arch Rheumatol 2016;31:41-7.
8. Shen B, Zhang A, Liu J, Da Z, Xu X, Gu Z. A primary analysis of sexual problems in chinese patients with ankylosing spondylitis. Rheumatol Int 2013;33:1429-35.
9. Christensen BS, Grønbæk M, Osler M, Pedersen BV, Graugaard C, Frisch M. Sexual dysfunctions and difficulties in denmark: Prevalence and associated sociodemographic factors. Arch Sex Behav 2011;40:121-32.
10. Rudwaleit M, van der Heijde D, Landewé R, Listing J, Akkoc N, Brandt J, et al. The development of assessment of spondyloarthritis international society classification criteria for axial spondyloarthritis (part ii): Validation and final selection. Ann Rheum Dis 2009;68:777-83.
11. Ware JE, Kosinski M. Sf-36 physical & mental health summary scales: A manual for users of version 1. 2 ed. Lincoln: QualityMetric Incorporated 2005.
12. Abraham L, Symonds T, Morris MF. Psychometric validation of a sexual quality of life questionnaire for use in men with premature ejaculation or erectile dysfunction. Journal of Sexual Medicine 2008;5:595-601.
13. Toy Ş, Özbağ D, Altay Z. The effects of pre-obesity on quality of life, disease activity, and functional status in patients with ankylosing spondylitis. North Clin Istanb 2017;4:52-9.
14. Kolotkin RL, Binks M, Crosby RD, Østbye T, Gress RE, Adams TD. Obesity and sexual quality of life. Obesity 2006;14:472-9.
15. Roussou E, Sultana S. Spondyloarthritis in women: Differences in disease onset, clinical presentation, and bath ankylosing spondylitis disease activity and functional indices (basdai and basfi) between men and women with spondyloarthritides. Clin Rheumatol 2011;30:121-7.
16. Östlund G, Björk M, Thyberg I, Thyberg M, Valtersson E, Stenström B, et al. Emotions related to participation restrictions as experienced by patients with early rheumatoid arthritis: A qualitative interview study (the swedish tira project). Clin Rheumatol 2014;33:1403-13.
17. Aguiar R, Ambrosio C, Cunha I, Barcelos A. Sexuality in spondyloarthritis--the impact of the disease. Acta Reumatol Port 2014;39:152-7.
18. Pinn VW. Sex and gender factors in medical studies: Implications for health and clinical practice. JAMA 2003;289:397-400.
19. van Berlo W, van de Wiel H, Taal E, Rasker J, Weijmar Schultz W, van Rijswijk M. Sexual functioning of people with rheumatoid arthritis: A multicenter study. Clin Rheumatol 2007;26:30 - 8.

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

20. Healey EL, Haywood KL, Jordan KP, Garratt AM, Ryan S, Packham JC. Ankylosing spondylitis and its impact on sexual relationships. Rheumatology 2009;48:1378-81.
21. Davis J, Van Der Heijde D, Dougados M, Woolley J. Reductions in health-related quality of life in patients with ankylosing spondylitis and improvements with etanercept therapy. Arthritis Rheum-Arthritis Care Res 2005;53:494-501.
22. Sieper J, Holbrook T, Black CM, Wood R, Hu X, Kachroo S. Burden of illness associated with non-radiographic axial spondyloarthritis: A multiperspective european cross-sectional observational study. Clin Exp Rheumatol 2016;34:975-83.
23. Sieper J, van der Heijde D, Dougados M, Mease PJ, Maksymowych WP, Brown MA, et al. Efficacy and safety of adalimumab in patients with non-radiographic axial spondyloarthritis: Results of a randomised placebo-controlled trial (ability-1). Ann Rheum Dis 2013;72:815.
24. Braun J, Davis J, Dougados M, Sieper J, van der Linden S, van der Heijde D. First update of the international asas consensus statement for the use of anti-tnf agents in patients with ankylosing spondylitis. Ann Rheum Dis 2006;65:316.
25. Terenzi R, Monti S, Tesei G, Carli L. One year in review 2017: Spondyloarthritis. Clin Exp Rheumatol 2018;36:1-14.
26. Berg KH, Rohde G, Prøven A, Almås E, Benestad E, Østensen M, et al. Exploring the relationship between demographic and disease-related variables and perceived effect of health status on sexual activity in patients with axial spondyloarthritis: Associations found only with non-disease variables. Scand J Rheumatol 2017:1-7.
27. Toy S, Ozbag D, Altay Z. The effects of pre-obesity on quality of life, disease activity, and functional status in patients with ankylosing spondylitis. North Clin Istanb 2017;4:52.
28. Woertman L, van den Brink F. Body image and female sexual functioning and behavior: A review. J Sex Res 2012;49:184-211.
29. Helland Y, Dagfinrud H, Kvien T. Perceived influence of health status on sexual activity in ra patients: Associations with demographic and disease-related variables. Scand J Rheumatol 2008;37:194-9.
30. Smolen JS, Braun J, Dougados M, Emery P, FitzGerald O, Helliwell P, et al. Treating spondyloarthritis, including ankylosing spondylitis and psoriatic arthritis, to target: Recommendations of an international task force. Ann Rheum Dis 2014;73:6-16.
31. Nicolosi A, Laumann EO, Glasser DB, Moreira Jr ED, Paik A, Gingell C. Sexual behavior and sexual dysfunctions after age 40: The global study of sexual attitudes and behaviors. Urology 2004;64:991-7.

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

Table 1 Sub categories in the Sexual Quality of Life questionnaire reflecting various aspects of sexual quality of life (3)

Category	Questions in SQOL-F questionnaire (question nr)	Total score Range (18-108)	High score indicates pos./neg. direction:
Psychosexual Feelings	• "Frustrated" (2) • "Depressed" (3) • "Anxious" (7) • "Angry" (8) • "Worry" (10) • "Worry of partner' hurt or rejection" (16) • "Feeling like loosing of something" (17)	7-42	Positive
Sexual and Relationship Satisfaction	• "Enjoy" (1) • "Good feeling about oneself" (5) • "Closeness to partner" (9) • "Talk to partner about sexual matters" (13) • "Satisfaction with frequency of sexual activity" (18)	5-30	Negative
Self-Worthlessness	• "Feeling like less of a woman/man" (4) • "Losing confidence "(6) "Feeling of guilt "(15)	3-18	Positive
Sexual Repression range	• "Loss of pleasure" (11) • "Embarrassed" (12) • "Avoiding" (14)	3-18	Positive

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Table 2 Demographic data, disease markers, disease activity measures, damage, health status, treatment and co-morbidity in 360 patients with axial spondyloarthritis. Continued variables are presented as mean with standard deviation (SD) and categorical variables as numbers with percentage (%)

	All (n=360)	Women (n=120)	Men (n=240)	P value
Demographic				
Age (years)	45.5 (11.9)	45.0 (12.0)	46.0 (12.0)	0.797
Living alone	282 (78%)	91 (76%)	191 (80%)	0.374
BMI (kg/m2)	26.9 (4.6)	25.4 (4.4)	27.5 (4.5)	< 0.001
Current smoker (years)	96 (27%)	32 (27%)	64 (27%)	0.966
Alcohol				0.051
Never	64 (18%)	29 (24%)	35 (15%)	
1-6 glass	254 (71%)	81 (68%)	173 (73%)	
7 glasses or more	38 (11%)	9 (8%)	29 (12%)	
Education (years)				0.644
< 10	38 (11%)	13 (11%)	25 (11%)	
11-13	116 (32%)	35 (29%)	81 (34%)	
> 13	204 (57%)	72 (60%)	132 (56%)	
Employed/self-employed	256 (71%)	78 (68%)	178 (77%)	0.090
Exerceise > 1 h/week	309 (86%)	105 (88%)	204 (86%)	0.510
Disease dur (years)	14.0 (11.3)	12.6 (11.0)	14.8 (11.0)	0.082
Co-morbidity				
Total score for co-morbidity (range 0-10)	0.7 (0.9)	0.8 (0.9)	0.7 (0.9)	0.525
Disease marker				
HLAB-27 positive (n=349)	316 (88%)	100 (86%)	216 (93%)	0.051
Disease activity measures				
CRP (mg/L)	8.5 (12.1)	7.7 (13.0)	8.9 (11.0)	0.424
68 tender joint count	0.39 (1.7)	0.33 (1.0)	0.22 (2.0)	0.398
66 swollen joint count	0.10 (0.6)	0.06 (0.3)	0.12 (0.7)	0.254
BASDAI (0-10)	3.1 (2.1)	3.4 (2.0)	3.0 (2.0)	0.080
MASES enthesitis score	3.2 (3.7)	4.5 (3.8)	2.5 (3.4)	< 0.001
Damage				
BASMI (0-10)	2.4 (2.0)	2.0 (1.6)	2.6 (2.2)	0.005
Health status				

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Morning stiffness (minutes)				
< 30	215 (61%)	69 (60%)	146 (62%)	0.667
> 31	137 (39%)	47 (40%)	90 (38%)	
BASFI (0-10)	2.7 (2.2)	2.7 (2.2)	2.7 (2.2)	0.754
BAS-G (0-10)	3.8 (2.5)	4.0 (2.4)	3.8 (2.6)	0.539
HAQ (0-3)	0.6 (0.5)	0.6 (0.5)	0.5 (0.5)	0.025
Health related QOL				
SF36 PCS	39.8 (9.4)	38.8 (9.1)	40.3 (9.6)	0.163
SF 36 MCS	48.4 (10.4)	47.9 (10.3)	48.6 (10.4)	0.569
Current treatment				
NSAID	159 (44%)	57 (48%)	102 (43%)	0.368
Synthetic DMARDs	17 (5%)	7 (6%)	10 (4%)	0.482
Biologic DMARDs	85 (24%)	22 (18%)	63 (26%)	0.095

Chi-square was used to compare categorical data and independent *t* tests for continuous variables. BMI = body mass index; BASDAI = Bath Ankylosing Spondylitis Activity Index (range: 1-10); MASES = the Maastricht Ankylosing Spondylitis Enthesitis Score (range 1-13); CRP = C-reactive protein; BASFI = Bath Ankylosing Spondylitis Functional Index (range 0-10); BASMI = Bath Ankylosing Spondylitis Metrology Index; HAQ = Health Assessment Questionnaires (range 0-4); BAS-G = Bath Ankylosing Spondylitis Patients Global Score (range 0-10), NSAID = Nonsteroidal anti-inflammatory drugs (NSAID); DMARDs = disease-modifying antirheumatic drugs

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

Table 3 Sexual Quality of life assessed by the Sexual Quality of Life questionnaire in 360 axial Spondyloarthritis patients. Data presented as SQOL sum score and SQOL sub scores, for all and for men and women separately

	All (360)	Women (n=120)	Men (n=240)	P value
SQOL sum score (range18-108)	76.6 (11.3)	74.7 (11.9)	77.6 (10.9)	0.026
Psychosexual feelings (range 7-42)	33.3 (8.3)	32.2 (8.9)	33.8 (8.0)	0.087
Sexual and Relationship Satisfaction (range 5-30)	12.5 (5.8)	12.9 (6.2)	12.3 (5.6)	0.361
Self-Worthlessness (range 3-18)	15.6 (3.4)	15,1 (3.5)	15.7 (3.3)	0.112
Sexual-Repression (range 3-18)	15.2 (3.7)	14.4 (4.1)	15.6 (3.4)	0.005

Independent *t* tests were used when comparing the groups continuous variables are expressed as mean (standard deviation); Psychosexual Feelings Range 7-42; Sexual and Relationship Satisfaction 5-30; Self-Worthlessness Range 3-18. Sexual- Repression Range 3-18; SQOL-F Sum Range 18-108

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Table 4 Univariate associates between demographic data, disease markers, disease activity measures, damage, health status, treatment, co-morbidity and Sexual Quality of Life (measured by SQOL questionnaire) total score and sub scores explored in 360 patients with axial spondyloarthritis

	SQOL-F Sum (Range 18-108)		Psychosexual (Range 7-42)		Sexual and Relationship Satisfaction (Range 5-30)		Self-Worthlessness (Range 3-18)		Sexual-Repression (Range 3-18)	
	B (95% CI)	P	B (95% CI)	P	B (95% CI)	P	B (95% CI)	P	B (95% CI)	P
Age (years)	- 0.49 (-0.15,0.05)	0.328	-0.01 (-0.08,0.06)	0.795	0.038 (-0.01,0.09)	0.142	-0.02 (-0.05,0.01)	0.148	-0.06 (-0.09, -0.02)	< 0.001
Male	3.04 (0.56,5.51)	0.017	1.76 (-0.07,3.59)	0.059	-0.66 (-1.95,0.62)	0.310	0.64 (-0.10,1.39)	0.088	0.128 (0.48,2.08)	0.002
Living alone	0.49 (-2.38,3.36)	0.736	-1.18 (-3.28,0.93)	0.273	2.77 (1.32,4.21)	< 0.001	-0.57 (-1.42,0.28)	0.188	-0.52 (-1.45,0.42)	0.275
BMI (kg/m2)	-0.27 (-0.57,0.02)	0.071	-0.17 (-0.38,0.04)	0.108	0.06 (-0.09,0.20)	0.443	-0.09 (-0.18.-0.01)	0.035	-0.06 (-0.16,0.03)	0.207
Non-smoker	-0.12 (-2.79,2.55)	0.929	-0.38 (-2.34,1.59)	0.706	-0.46 (-1.82,0.90)	0.505	0.47 (-0.33,1.26)	0.249	-0.25 (-0.62,1.11)	0.580
Alcohol										

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Never	-0.58 (-5.13,3.98)	0.803	0.95 (-2.40,5.95)	0.576	-1.25 (-3.58,1.07)	0.290	0.36 (-0.98,1.70)	0.599	-0.53 (-2.00,0.94)	0.480
1-6 glass	2.46 (-1.41,6.33)	0.212	3.10 (0.26,5.95)	0.033	-2.69 (-4.67, -0.72)	0.008	1.43 (0.29,2.57)	0.014	0.62 (-0.63)	0.329
7 glasses or more	Ref.		Ref.		Ref.		Ref.		Ref.	
Education (years)										
< 10	-2.51 (6.45,1.43)	0.211	-0.31 (-3.22,2.59)	0.832	0.21 (-1.82,2.24)	0.840	-1.25 (-2.42, -0.08)	0.037	-1.15 (-2.42,0.13)	0.079
11-13	0.52 (-2.08,3.11)	0.696	0.86 (1.05,2.77)	0.377	-0.16 (-1.50,1.17)	0.811	-0.15 (-0.92,0.62)	0.710	-0.02 (-0.87,0.82)	0.956
> 13	Ref.		Ref.		Ref.		Ref.		Ref.	
Not Employed/self-employed	-3.64 (-6.4,9.4)	0.008	-3.64 (-6.34, -0.94)	0.008	0.98 (-0.40,2.36)	0.162	-0.80 (-1.62,0.01)	0.053	-1.41 (-2.29, -0.54)	0.002
Exerceise <1 h/week	-3.12 (-6.58,0.33)	0.076	-1.90 (-4.44,0.64)	0.143	0.63 (1.15,2.41)	0.487	-0.66 (-1.69,0.37)	0.209	-1.19 (-2.31, -0.06)	0.038
Disease dur (years)	-0.01 (-0.11,0.10)	0.918	0.02 (-0.06,0.10)	0.612	0.04 (-0.02,0.09)	0.161	-0.02 (-0.05,0.01)	0.160	-0.04 (-0.08, -0.01)	0.019
Co-morbidity										

Accepted Article

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Total score for co-morbidity (range 0-10)	-1.96 (-3.12, -0.70)	0.002	-1.29 (-2.22, -0.36)	0.007	0.85 (0.21,1.50)	0.010	-0.59 (-0.96, -0.22)	0.002	-0.92 (-1.32, -0,52)	< 0.001
Disease marker										
HLAB-27 positive (n=349)	2.15 (-1.96,6.27)	0.304	1.93 (-1.09,4.96)	0.210	-0.22 (-2.31,1.88)	0.839	-0.04 (-1.24,1.17)	0.953	0.54 (-0.78,1.86)	0.423
Disease activity measures										
CRP (mg/L)	-0.06 (-0.16,0.04)	0.264	-0.05 (-0.12,0.03)	0.201	0.05 (-0,01,0.10)	0.077	-0.03 (-0.06,0.00)	0.091	-0.03 (-0.06,0.00)	0.069
68 tender joint count	-3.2 (-1.01,0.36)	0.354	-0.14 (-0.64,0.37)	0.596	-0.94 (-0.55,0.16)	0.279	-0.02 (-0.23,0.18)	0.829	0.03 (-0.19,0.25)	0.791
66 swollen joint count	-1.65 (-3.58,0.29)	0.095	-0.59 (-2.02,0.84)	0.418	-0.43 (-1.43,0.56)	0.392	-0.38 (-0.96,0.20)	0.198	-0.24 (-0.88,0.39)	0.450
BASDAI (0-10)	-1.36 (-1.92, -0.80)	< 0.001	-1.08 (-1.48, -0.67)	< 0.001	0.37 (0.08,0.66)	0.012	-0.31 (-0.47, -0.14)	< 0.001	-0.35 (-0.54, -0.17)	< 0.001
MASES enthesitis score	-0.27 (-0.59 ,0.05)	0.100	-0.183 (-0.42,0.05)	< 0.001	-0.06 (-0.23,0.10)	0.443	-0.03 (-0.13,0.07)	0.550	0.01 (-0.10,0.11)	0.889

Accepted Article

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Damage										
BASMI (0-10)	-0.76 (-1.34, -0.17)	0.011	-0.42 (-0.85,0.01)	0.058	0.19 (-0.11,0.49)	0.223	-0.27 (-0.44, -0.10)	0.002	-0.26 (-0.45, -0.07)	0.009
Health status										
Morning stiffness										
<30	3.01 (0.57,5.45)	0.016	2.46 (0.66,4.25)	0.007	-0.62 (-1.87,0.64)	0.335	0.46 (0.27,1.16)	0.219	0.73 (-0.06,1.53)	0.071
>31	Ref.		Ref.		Ref.		Ref.		Ref.	
BASFI (0-10)	-1.27 (-1.79, -0.76)	<0.001	-0.91 (-1.29, -0.53)	<0.001	0.36 (0.09,0.63)	0.010	-0.36 (-0.52, -0.21)	<0.001	-0.36 (-0.53, -0.19)	<0.001
BAS-G (0-10)	-1.28 (-1.73, -0.03)	<0.001	-1.00 (-1.33, -0.67)	<0.001	0.38 (0.14,0.61)	0.002	-0.32 (-0.45, -0.18)	<0.001	-0.34 (-0.49, -0.20)	<0.001
HAQ (0-3)	-4.32 (-6.69, -1.95)	<0.001	-3.42 (-5.26, -1.68)	<0.001	1.67 (0.44,2.90)	0.008	-1.14 (-1.85, -0.43)	0.002	-1.44 (-2.22, -0.67)	<0.001
Health related QOL										
SF36 PCS	0.20 (0.07,0.32)	0.002	0.16 (0.07, 0.25)	0.001	-0.05 (-0.11,0.02)	0.164	0.04 (0.00,0.08)	0.035	0.05 (0.00,0.09)	0.030
SF 36 MCS	0.34 (0.23,0.45)	<0.001	0.29 (0.21,0.37)	<0.001	-0.17 (-0.23, -0.11)	<0.001	0.10 (0.07,0.14)	<0.001	0.12 (0.08,0.15)	<0.002
Current treatmet										

Accepted Article

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

NSAID last 10 days	0.23 (-2.16,2.60)	0.847	0.09 (-1.65, 1.84)	0.916	0.15 (-1.06,1.37)	0.804	0.06 (-0.64,0.77)	0.859	-0.09 (-0.86,0.68)	0.817
Synthetic DMARDs	2.18 (-3.357.72)	0.438	1.58 (-2.50, 5.65)	0.448	-0.99 (-3.83,1.86)	0.497	1.02 (-0.62,2.67)	0.223	0.56 (-1.24,2.37)	0.539
Biologic DMARDs	3.46 (0.72,6.20)	0.014	2.19 (0.16, 4.22)	0.034	-0.77 (-2.19,0.65)	0.289	1.35 (0.54,2.16)	0.001	0.68 (-0.22,1.58)	0.139

Univariate association were performed using General Linear model B (95% CI), and P ; BMI, body mass index; BASDAI, Bath Ankylosing Spondylitis Activity Index; MASES, Maastricht Ankylosing Spondylitis Enthesitis Score; BASFI, Bath Ankylosing Spondylitis Functional Index; BAS-G, Bath Ankylosing Spondylitis Patients Global Score; BASMI=Bath Ankylosing Spondylitis Metrology Index ; HAQ, health assessment questionnaire; BASMI, Bath Ankylosing Spondylitis Metric Index; NSAID= Nonsteroidal anti-inflammatory drugs (NSAID); DMARDs= disease-modifying antirheumatic drugs

Accepted Article

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org

Accepted Article

Table 5 Independent associations between demographic data, disease markers, disease activity measures, damage, health status, treatment, co-morbidity and Sexual Quality of Life (measured by SQOL questionnaire) explored in 360 patients with axial spondyloarthritis

	SQOL-F Sum (Range 18-108)		Psychosexual feelings (Range 7-42)		Sexual and Relationship Satisfaction (Range 5-30)		Self-Worthlessness (Range 3-18)		Sexual-Repression (Range 3-18)	
	Adj. B (95% CI)	P	Adj. B (95% CI)	P	Adj. B (95% CI)	P	Adj. B (95% CI)	P	Adj. B (95% CI)	P
Demographic factors										
Age (years)	-0.04 (-0.18,0.09)	0.521	0.02 (-0.12,0.08)	0.689	0.06 (0.01,0.13)	0.099	-0.03 (0.07,0.01)	0.189	-0.05 (-0.10,0.01)	0.014
Male	4.22 (0.85,7.59)	0.014	2.44 (0.06,4.83)	0.045	-0.86 (-2.57,0.84)	0.319	1.11 (0.13,2.10)	0.027	1.37 (0.30,2.43)	0.012
Living alone	1.47 (-2.18,5.13)	0.428	-0.95 (-3.54,1.64)	0.471	3.11 (1.26,4.95)	0.001	-0.19 (-1.25,0.087)	0.722	-0.23 (-1.37,0.92)	0.694
Employed/self-employed	-0.45 (-4.04,3.15)	0.807	-0.01 (-2.55,2.54)	0.997	-0.81 (-2.63,1.01)	0.379	0.16 (0.89,1.22	0.764	-0.04 (-1.18,1.10)	0.946
Education										
< 10 years	-2.51 (-7.61,2.60)	0.334	-1.23 (-4.84,2.39)	0.054	1.01 (-1.57,3.59)	0.440	-1.06 (-2.53,0.042)	0.160	-0.86 (-2.47,0.34)	0.289

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

11–13 years	1.21 (-1.99,4.42)	0.458	0.97 (-1.31,3.24)	0.403	-0.08 (-1.70)	0.926	-0,42 (-0.98,0.90)	0.930	0.34 (-0.68,1.36)	0.511
> 13 years	Ref.	Ref.	Ref	Ref	Ref	ref	Ref	ref	Ref	ref
Exercise < 1 h/week	-3.79 (-7.93,0.35)	0.072	-1.93 (-4.86,1.00)	0.196	0.05 (-2.02,2.14)	0.961	-0.54 (-1.75,0.07)	0.377	-1.17 (-2.48,0.14)	0.080
Current smoker	-1,33 (-4.63,1.97)	0.427	-1.48 (-3.81,0.87)	0.218	0.11 (-1.57,1.78)	0.901	-0.05 (-1.01,0.92)	0.924	0.12 (-0.93,1.17)	0.821
Alcohol (per week):										
Never	-0.34 (-6.15,5.47)	0.908	-1.02 (-5.13,3.10)	0.626	1.54 (-1.39,4.48)	0.302	-0.31 (-2.01,1,38)	0.717	-0.40 (-2.24,1.44)	0.667
1–6 glasses	2.23 (-2.64,7.11)	0.367	1.24 (-2.21,4.69)	0.480	-0.51 (-2.97,1.95)	0.683	0.93 (-0.51,2.36)	0.204	0.60 (-0.96,2.15)	0.451
7 or more glasses	Ref	ref	Ref	ref	Ref	ref	Ref	Ref	Ref	ref
BMI (kg/m^2)	-0.36 (-0.69,-0.03)	0.034	-0.29 (-0.52,0.06)	0.015	0.15 (-0.2,0.32)	0.075	-0.11 (-0.21,0.02)	0.021	-0.09 (-0.20,0.01)	0.088
Disease activity Measures										
BASDAI (range 0–10)	-0.14 (-1.42,1.14)	0.829	-0.35 (-1.25,0.56)	0.455	0.17 (-0.48,0.82)	0.601	0.04 (-0.34,0.42)	0.840	0.02 (-0.40,0.42)	0.967
MASES (range 0–13)	0.11 (-0.34,0.55)	0.639	0.03 (-0.29, 0.34)	0.863	-0.10 (-0.33,0.12)	0.367	0.07 (-0.06,0.20)	0.291	0.10 (-0.06,0.24)	0.182
CRP (mg/dl)	-0.15 (-0.29, -0.02)	0.026	-0.9 (-0.19, 0.003)	0.059	0,04 (-0.03,0.11)	0.224	-0.05 (-0.09, -0.01)	0.015	-0.05 (-0.19, -0.01)	0.017

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

Health status										
BASFI (range 0–10)	0.14 (-1.41,1.69)	0.857	0.52 (-0.57,1.62)	0.348	-0.56 (-1.34,0.23)	0.162	0.07 (-0.38,0.53)	0.748	0.02 (-0.47,0.52)	0.924
BAS-G (range 0–10)	-1.70 (-2.74, -0.66)	0.002	-1.36 (-2.10,0.63)	< 0.001	0.65 (0.12,1.18)	0.016	-0.49 (-0.80,0.19)	0.002	-0.42 (-0.75, +.09)	0.013
HAQ (range 0–3)	2.45 (-2.72,7.62)	0.351	0.55 (-3.11,4.21)	0.766	0.89 (-1.72,3.50)	0.503	0.59 (-0.93,2.11)	0.443	0.25 (-1.40,1.90)	0.767
Damage										
BASMI (range 0–10)	0.18 (-6.69,1.05)	0.667	0.21 (0.41,0.82)	0.507	-0.18 (-0.62,0.26)	0.412	0.04 (-0.21,0.30)	0.752	0.10 (-0.17,0.38)	0.463
Co-morbidity Mean total score for co-morbidity (range 0–10)	-1.65 (-3.55,0.25)	0.088	-0.75 (-2,10,0.60)	0.275	0.30 (-0.66,1.26)	0.542	-0.55 (-1.11,0.00)	0.052	-0.56 (-1.16,0.46)	0.070
Current treatment										
NSAID	-0.002 (-3.03,3.03)	0.999	-0.37 (-2.52,1.77)	0.733	0.31 (-1.23,1.83)	0.695	0.23 (-0.66,1.12)	0.616	-0.01 (-0.97,0.96)	0.986
Synthetic DMARDs	2.61 (-4.23,9.47)	0.454	1.00 (-2.86,6.86)	0.419	-1.02 (-4.49,2.45)	0.564	0.92 (-1.10,2.94)	0.373	0.69 (-1.51,2.88)	0.538
Biologic DMARDs	6.43 (2.85,10.01)	< 0.001	3.91 (1.38,6.45)	0.003	-0.68 (-2.49,1.13)	0.459	1.89 (0.84,2.93)	< 0.001	1.17 (0.03,2.30)	0.044
Centre										

Downloaded on January 13, 2023 from www.jrheum.org

This accepted article is protected by copyright. All rights reserved.

Accepted Article

SSHF (N/Y)	1.66 (-1.88,5.22)	0.357	2.31 (-0.21,4.82)	0.072	-2.18 (-3.97,0.38	0.018	0.65 (-0.40,1.69)	0.224	0.80 (-0.33,1.04)	0.165
R^2	16.5%		16.7%		9.7%		16.9%		16.3%	

Adjusted analyses were performed using multiple regression analyses and applying a general linear model using SPSS.Key: Adj., adjusted unstandardized regression coefficients with 95% confidence interval (CI) and P values; BMI, body mass index; BASDAI, Bath Ankylosing Spondylitis Activity Index; MASES, Maastricht Ankylosing Spondylitis Enthesitis Score; BASFI, Bath Ankylosing Spondylitis Functional Index; BAS-G, Bath Ankylosing Spondylitis Patients Global Score; BASMI=Bath Ankylosing Spondylitis Metrology Index ; HAQ, health assessment questionnaire; BASMI, Bath Ankylosing Spondylitis Metric Index; NSAID= Nonsteroidal anti-inflammatory drugs (NSAID); DMARDs= disease-modifying antirheumatic drugs

This accepted article is protected by copyright. All rights reserved.

Downloaded on January 13, 2023 from www.jrheum.org