	BASDAI		BASMI		PGA		Fatigue		Sacroiliitis on radiograph or/and MRI	
	β	p	β	p	β	p	β	p	OR	p
Male gender	-0.963881	1.25 x10⁻⁸	0.647295	0.000856	-5.76893	0.00568	-1.319037	1.09x10⁻¹⁰	1.8793034	0.074607
Age at diagnosis	-0.003272	0.62910	0.025231	0.001720	-0.05975	0.47469	0.006319	0.4384	0.9995867	0.977807
HLA-B27	-0.503885	0.00182	-0.247478	0.164533	-7.96053	6.89 x10⁻⁵	-0.359688	0.0640	0.8436131	0.627840
CRP	0.004264	0.16449	0.004137	0.213673	0.02060	0.58906	-0.002740	0.4566	1.0014834	0.837317
Smoker	0.062283	0.73877	0.865084	0.000104	4.09464	0.08010	0.252386	0.2612	1.4020156	0.424626
Ex-smoker	0.171008	0.41963	0.627238	0.009923	3.94157	0.13256	0.304220	0.2324	2.4690088	0.150762
IBD	-0.699610	0.01762	-0.334230	0.288871	-1.95205	0.59487	-0.804620	0.0242	0.9475121	0.932460
ESR	0.024332	1.22x10⁻¹⁴	0.011760	0.000525	0.31131	1.08x10⁻¹⁵	0.024713	5.52x10⁻¹¹	1.0060363	0.400118

Table 1: Multiple variable analysis to adjust the gender effect on the outcome variables.

OR: Odds ratio; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASMI: Bath Ankylosing Spondylitis Metrological Index; PGA: Patient Global Assessment; HLA-B27: Human Leukocyte Antigen-B27; CRP: C-reactive protein; ESR: erythrocyte sedimentation rate; IBD: inflammatory bowel disease; MRI: magnetic resonance imaging

POS0951

ASSOCIATION BETWEEN INDIVIDUAL AND COUNTRY-LEVEL SOCIOECONOMIC FACTORS AND HEALTH OUTCOMES IN AXIAL AND PERIPHERAL SPONDYLOARTHRITIS: ANALYSIS OF THE ASAS PERSPA STUDY

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Background: Health outcomes in spondyloarthritis (SpA) are largely determined by socioeconomic (SE) factors, leading to the great inequity observed between countries across the world. However, the impact of these SE factors on health outcomes across the different SpA phenotypes (axSpA, pSpA and PsA), is less well known.

Objectives: To investigate (1) the association between individual and country-level SE factors and health outcomes in different SpA phenotypes, and (2) to explore whether any effect of these SE factors is mediated by the use of b/tsDMARD therapy.

Methods: Patients with axSpA, pSpA or PsA from the multinational cohort ASAS-perSpA were included in the analysis. The effect of individual (age, gender, education and marital status) and country-level SE factors (Gross Domestic Product [GDP], Healthcare Expenditure [HCE], Human Development Index [HDI], Gini Index) over health outcomes (ASDAS $\geq$ 2.1, continuous ASDAS, BASFI, fatigue and ASAS-HI) were assessed in multivariable mixed-effects logistic and linear regression models (as appropriate), adjusting for confounders. Interactions between each individual and country-level SE factors and disease phenotype and between both levels of SE factors, were tested. Finally, a mediation analysis was conducted to explore whether the impact of country-level SE factors on ASDAS is mediated through b/tsDMARD uptake.

Results: A total of 4185 patients from 23 countries were included: 61% males, mean age 45 (SD 14), 65% axSpA, 10% pSpA and 25% PsA. Female gender, lower educational level and marital status (single vs married) were associated with higher ASDAS, without significant differences across disease phenotype. Living in lower-(vs higher) GDP countries was also associated with higher ASDAS (β =0.39

[95%CI 0.16; 0.63], with similar results for other economic indicators (Figure 1). 7% of the association between GDP and ASDAS was mediated by b/tsDMARD uptake. The above-mentioned individual and country-level SE factors remained significant to discriminate active disease (ASDAS $\geq$ 2.1), with greater impact of gender (OR=1.32 [1.13; 1.54]), educational level (primary vs university OR=1.76 [1.40;2.20]) and lower GDP (OR= 1.74 [1.22;2.46]). Higher BASFI was also associated with gender (female vs male: β =0.12 [0.01; 0.24]), lower education (primary vs university: β =0.29 [0.11; 0.46]), and marital status (single vs married: β =0.23 [0.09; 0.38]), without effect of country-level SE factors, and no differences across SpA phenotype. Gender and lower educational level were similarly associated with worse ASAS-HI scores (female vs male β =0.88 [0.68;1.09], and primary vs university β =0.61 [0.31;0.91]), while more fatigue was only associated with female gender and, in an opposite direction, with higher country-level SE factors (Figure 1). No interactions were found between individual and country-level SE factors for any of the outcomes.

Conclusion: Individual (female gender and lower education) and country-level SE factors are independently associated with higher disease activity in SpA. Uptake of b/tsDMARD had a small mediating effect on the association between GDP and ASDAS. Lower education and female gender are also associated with worse outcomes of functional disability, global functioning and fatigue. Country-level SE factors are not associated with functional disability or global functioning; in contrast, there is a paradoxical effect with fatigue: living in a country with a higher SE status is independently associated with higher levels of fatigue. Management of disease outcome in SpA requires also awareness of the role of individual and country level SE-factors.

Figure 1. Effect of individual and country-level socioeconomic factors on ASDAS and fatigue, derived from multivariable mixed-effects models adjusted by clinical confounders.

Disclosure of Interests: Dafne Capelusnik Speakers bureau: BMS, Grant/research support from: Pfizer, Sizheng Steven Zhao: None declared, Annelies Boonen: None declared, Nelly Ziade Speakers bureau: Roche, Abbvie, Eli Lilly, Pfizer, Janssen, Novartis, Pierre Fabre, Apotex, Pharmaline, Paid instructor for: Abbvie, Eli Lilly, Sanofi-Aventis, Pfizer, Janssen, Consultant of: Roche, Abbvie, Eli Lilly, Pfizer, Janssen, Novartis, Gilead, NewBridge, Grant/research support from: Abbvie, NewBridge, Algorithm/Celgene, Clementina López-Medina: None declared, Maxime Dougados: None declared, Elena Nikiforou Speakers bureau: Pfizer, Lilly, AbbVie, Sofia Ramiro Speakers bureau: Lilly, MSD, Novartis, UCB, Consultant of: AbbVie, Lilly, MSD, Novartis, UCB, Sanofi, Grant/research support from: MSD

DOI: 10.1136/annrheumdis-2021-eular.504

POS0952

RESPONSIVENESS OF SPINAL MOBILITY MEASUREMENTS IN AXIAL SPONDYLOARTHRITIS USING CONVENTIONAL AND ADVANCED METROLOGY: A PILOT STUDY

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Background: Spinal mobility is an important outcome in axial spondyloarthritis (axSpA). Standardized metrology tests have been defined and validated. Nevertheless, conventional metrology measures lack responsiveness, particularly in the context of assessing short term response to treatments. Advanced metrology devices have also been used in axSpA, namely optical motion capture systems (MoCap) and Inertial Measurement Systems (IMU). These systems have better psychometric properties in terms of accuracy and reliability for analysing spinal mobility.

Objectives: To compare the responsiveness of spinal mobility using conventional and advanced metrology.

Methods: Spinal mobility was measured using an IMU based system (ViMove©) with sensors located at: occiput and T3 for cervical mobility, L1 and sacrum for lumbar mobility, and T3 and sacrum for thoracic+lumbar mobility. A MoCap system (UCOTrack©) using 13 markers was also used to record the movements in 3 planes (flexion+extension, rotation, and lateral flexion). The UCOASMI [1] index was calculated using measures obtained by MoCap and by the IMU system. Other metrology indexes based on IMU measures developed by the authors [2] were also calculated. Patients were assessed before (PRE) and 3 months after (POST) TNF blocker treatment. The Wilcoxon signed-rank test was used to test differences between pairs of pre- and post-treatment. Cohen's d was used for calculating the effect size of improvement.

Results: 12 axSpA patients were recruited from the CASTRO cohort (42% female, age 46±11 years, disease duration 16±13 years). Results PRE and POST are shown in Table 1: means (sd), statistical significance, and effect size. Disease activity and functional indexes were lower in POST and these differences were significant, especially in ASDAS. Conventional metrology lacked responsiveness, except for cervical rotation. MoCap showed moderate

responsiveness in cervical rotation, in thoracolumbar mobility and with regards to the UCOASMI. Using IMU measures, responsiveness was good in terms of cervical flexion and rotation. For Lumbar (L₁) and Lumbar Thoracic (LT₁), lateral flexion shown significant improvement and lumbar rotation shown the best responsiveness.

	PRE	POST	Sign	ES		PRE	POST	Sign	ES
<i>Activity</i>									
<i>IMU</i>									
BASDAI	6.5 (1.6)	4.9 (2.7)	*	0.64	C_FLEX	77 (22)	83 (19)	*	-0.25
BASFI	6.5 (2.3)	4.8 (3.2)	*	0.58	C_ROT	78 (25)	84 (22)	*	-0.22
ASDAS	3.6 (1.0)	2.5 (1.2)	**	0.87	C_FL	54 (19)	54 (17)	NS	
<i>Metrology</i>									
LatFlex	9.3 (4.1)	10.6 (3.3)	NS		L_FLEX	46 (16)	44 (19)	NS	
TWD	13.2 (4.2)	12.8 (3.6)	*	0.06	L_ROT	21 (9)	27 (9)	***	-0.66
Schober	4.7 (1.5)	4.9 (1.5)	NS		L_FL	32 (1)	38 (10)	*	-0.52
IMD	89 (15)	90 (15)	NS		LT_FLEX	62 (28)	63 (24)	NS	
CervRot	104 (28)	118 (24)	**	-0.51	LT_ROT	63 (19)	70 (19)	NS	
BASMI	3.8 (1.3)	3.4 (1.2)	NS		LT_FL	52 (15)	60 (15)	**	-0.51
<i>MoCap</i>									
C_FLEX	81 (22)	87 (20)	*	-0.28	Trk_FLEX	109 (28)	112 (24)	NS	
C_ROT	101 (28)	112 (25)	***	-0.38	Trk_ROT	98 (31)	116 (21)	**	-0.59
C_FL	58 (20)	58 (18)	NS		Trk_FL	39 (9)	46 (10)	**	-0.7
L_FLEX	107 (24)	114 (21)	***	-0.26	TTrk_FLEX	119 (36)	128 (30)	NS	
L_ROT	67 (21)	73 (20)	NS		TTrk_ROT	137 (34)	161 (35)	**	-0.67
L_FL	57 (18)	65 (20)	**	-0.41	iUCOASMI	5.7 (1.5)	5.0 (1.4)	***	0.48
UCOASMI	6.1 (1.6)	5.3 (1.6)	**	0.50	iUCOASMIT	6.0 (1.5)	5.4 (1.3)	**	0.39
					iCXLASMI	3.9 (1.8)	3.2 (1.5)	**	0.40
					iCLuASMI	3.2 (1.4)	2.7 (1.3)	***	0.40

NS, not significant; *, p<0.05; **, p<0.01

Conclusion: Conventional metrology lacks short-term responsiveness. Advanced metrology using MoCap and IMU showed, in this pilot study, better responsiveness compared to conventional measures. Furthermore, IMU provide a feasibility similar to conventional metrology, and could be easily implemented in the context of clinical trials and observational studies.

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Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2021-eular.562

POS0953

PERIPHERAL ARTHRITIS AND HIGHER DISEASE ACTIVITY LEAD TO MORE FUNCTIONAL IMPAIRMENT IN AXIAL SPONDYLOARTHRITIS: LONGITUDINAL ANALYSIS FROM ESPAXIA

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Background: Preserving functional ability is among the main goals when treating patients with axSpA. Higher disease activity, reduced axial mobility, and increase spinal radiographic damage, and smoking status have shown to be longitudinally associated with functional worsening. The presence of peripheral arthritis has also been associated with worse functional ability during follow-up, though not in a true longitudinal analysis.

Objectives: To investigate whether peripheral arthritis together with disease activity independently contribute to functional impairment over time in patients with axSpA and to evaluate if there are contextual factors modifying this relationship.

Methods: Patients with axSpA from the ESPAXIA cohort were followed-up annually over 7 years. Physical function was assessed by the self-reported questionnaire BASFI, disease activity by ASDAS and peripheral arthritis was also recorded. The association between BASFI (outcome), peripheral arthritis and ASDAS (main variables of interest) over time was tested in generalized estimating equations (GEE) models. Models were autoregressive, i.e. adjusted for BASFI 1 year earlier, to allow for a truly longitudinal interpretation. Interactions between each of ASDAS and peripheral arthritis with contextual factors were tested.

Results: 185 patients were included (77 % male, mean age 42 (SD 13), mean disease duration 9.4 (SD 9.6) years. Mean baseline ASDAS was 2.3 (1.4), mean BASFI