RMD Open
Rheumatic & Musculoskeletal Diseases

ORIGINAL RESEARCH

Factors Associated with Poor Mental Health in Patients with Axial Spondyloarthritis: Results from the International Map of Axial Spondyloarthritis (IMAS)

Marco Garrido-Cumbrera ,[1,2] Victoria Navarro-Compán ,[3] Denis Poddubnyy ,[4,5] Fernando Sommerfleck,[6] Souzi Makri,[7] José Correa-Fernández,[1] Shashank Akerkar,[8] Jo Lowe,[9] Elie Karam,[10] Christine Bundy[11]

To cite: Garrido-Cumbrera M, Navarro-Compán V, Poddubnyy D, *et al*. Factors Associated with Poor Mental Health in Patients with Axial Spondyloarthritis: Results from the International Map of Axial Spondyloarthritis (IMAS). *RMD Open* 2024;**10**:e004218. doi:10.1136/rmdopen-2024-004218

► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/rmdopen-2024-004218).

Received 14 February 2024
Accepted 7 May 2024

For numbered affiliations see end of article.

Correspondence to
Professor Marco Garrido-Cumbrera; mcumbrera@us.es

ABSTRACT

Background This study aims to assess the prevalence of poor mental health in axial spondyloarthritis (axSpA) and its associated factors in a large sample of patients from the International Map of Axial Spondyloarthritis (IMAS) study from around the globe.

Methods IMAS is a cross-sectional online survey (2017–2022) that includes 5557 unselected patients with axSpA worldwide. Mental health was evaluated by the 12-item General Health Questionnaire (GHQ-12) and the cut-off point for poor mental health was set at 3. Logistic regression analysis was used to evaluate relationships between the investigated factors and poor mental health (GHQ-12≥3) in patients with axSpA (n=4335).

Results Of 5351 patients, the mean of GHQ-12 was 4.7 and 59.4% were having poor mental health, being 69.9% in South Africa, 63.7% in Latin America, 60.8% in Europe, 54.3% in North America and 51.8% in Asia. Overall, 40.5% and 37.2% of patients experienced anxiety and depression. The factors associated with poor mental health were younger age (OR=0.99), female gender (OR=1.16), being on sick leave or unemployed (OR=1.63), non-physical activity (OR=1.22), smoking (OR=1.20), higher Bath Ankylosing Spondylitis Disease Activity Index [BASDAI] (OR=1.42), functional limitation (OR=1.02) and shorter symptoms duration (OR=0.98).

Conclusions Globally, 6 in 10 patients with axSpA had poor mental health, with a higher proportion in South Africa and lower in Asia. The factors associated with poor mental health include domains such as younger age, female gender, employment difficulties, harmful habits, disease burden and symptom duration. A holistic management approach to axSpA should encompass both physical and mental health.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Impaired mental health in axial spondyloarthritis is associated with poorer physical outcomes and employment issues.

WHAT THIS STUDY ADDS

⇒ Patients with a higher disease burden—besides being on sick leave or unemployed—frequently experience mental health issues.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Emotional and psychological support through relevant therapies are essential to improve patients' quality of life.

INTRODUCTION

Axial spondyloarthritis (axSpA) is a chronic inflammatory disease that not only affects the physical domain,[1 2] but can also have a significant impact on mental health.[3] The mental health of patients with axSpA can be affected by several factors, such as chronic pain, physical disability, fatigue and worsening quality of life.[4–6] Persistent pain and limited mobility can lead specifically to stress, anxiety and depression in some patients.[7] In addition, chronic disease can affect interpersonal relationships, work and social activities, which can also contribute to emotional problems.[8]

In some cases, diagnostic delay and lack of appropriate treatment can lead to a deterioration in quality of life and increased emotional distress.[9 10] Younger age, being on sick leave or unemployed due to axSpA and the presence of functional limitations are factors associated with poorer mental health.[3] Also, disease activity is one of the most important determinants of the mental health of patients with axSpA.[11] However, misdiagnosis of mental health issues must be taken into account as

Table 1 Variables, questions and measurements/categories included in this analysis

Variables	Questions	Categories/measures
Socio-demographic		
Age	Please specify your age	In years
Gender	Please specify your gender	Male, female
Education level	Please select your level of education completed	No schooling, primary school, high school, university
Employment status	What is your current employment status?	Employed, unemployed, temporary sick leave, permanent sick leave, retired or early retired, homemaker, student
Patient association membership	Are you a member of any Support Group or Association for Spondylitis/ spondyloarthritis?	Yes, no
Life habits		
Physical activity	Do you do any physical or sporting activity, including walking?	Yes, no
Smoking	Please select the option that best describes your current smoking behaviour	Non-smoker, socially, less than 10 cigs/week, 10–20 cigs/week, 21–60 cigs/week, over 60 cigs/week
Alcohol consumption	Please select the option that best describes your alcohol consumption behaviour	Never, occasionally, one to three times per month, one to two times per week, three to five times per week, every day
Diagnosis characteristics		
Diagnostic delay	Calculated based on the age at diagnosis	In years
Symptom duration	Calculated based on the age of onset of first symptoms	In years
Disease extra-musculoskeletal manifestations		
Uveitis	Please indicate whether you have been diagnosed with any of the following:	Uveitis
Inflammatory bowel disease	Please indicate whether you have been diagnosed with any of the following:	Inflammatory bowel disease
Treatments		
NSAIDs	Have you ever been treated with a non-steroidal anti-inflammatory drug for your spondylitis/ spondyloarthritis?	Yes, no
bDMARDs	Have you ever been treated with a biologic for your spondylitis/ spondyloarthritis?	Yes, no
csDMARDs	Have you ever been treated with a conventional synthetic disease modifying anti-rheumatic drug for your spondylitis/ spondyloarthritis?	Yes, no

bDMARDs, biological disease-modifying antirheumatic drugs; csDMARDs, conventional synthetic disease-modifying antirheumatic drugs; NSAIDs, non-steroidal anti-inflammatory drugs.

a recent study showed misdiagnosis of mental problems such as sleep disorders instead of axSpA diagnosis.[9] A previous study of the European subsample of International Map of Axial Spondyloarthritis (IMAS) - European Map of Axial Spondyloarthritis (EMAS) - showed that patients with axSpA show disproportionately worse mental health associated mainly with disease activity and employment status.[3] In addition, it is important to assess anxiety and depression as they are frequent in axSpA and are associated with high disease activity and reduced work productivity.[7]

Considering the importance of mental health in patients with axSpA, this study aims to assess the prevalence and associated factors of poor mental health in a large sample of patients with axSpA from the IMAS study from around the globe.

METHODS

Survey design and sample recruitment

The IMAS initiative is a research collaboration between the Axial Spondyloarthritis International Federation,

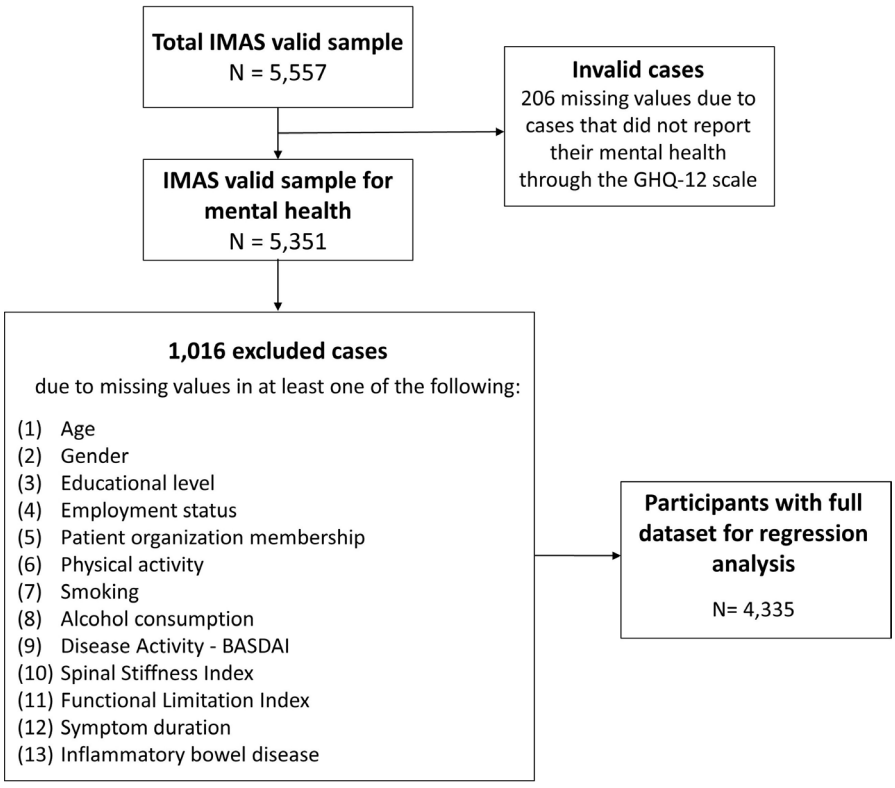

Figure 1 Flowchart of the study sample selection. BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; GHQ-12, 12-item General Health Questionnaire; IMAS, International Map of Axial Spondyloarthritis.

the Health and Territory Research (HTR) group of the University of Seville and Novartis Pharma AG, together with a scientific committee composed of patient with axSpA research partners, rheumatologists, psychologists and health researchers, involving a total of 27 countries worldwide. The IMAS questionnaire was carefully adapted and translated to each of the 27 participating countries. The most important adaptations and translations carried out concerned the validated Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and 12-item General Health Questionnaire (GHQ-12) scales, the currency used in each country to assess income as well as the assessment of ethnicity in some countries such as South Africa or Canada. The design and dissemination of the survey were described in detail in the European[12] and international seminal manuscripts.[13]

Ipsos[14] and local patient organisations recruited unselected patients between 2017 and 2022 through an online survey according to the criteria: age ≥18 years, resident in the specified country and with a self-reported diagnosis of axSpA (either radiographic axSpA, also referred to as ankylosing spondylitis or non-radiographic axSpA).

Variables

The variables of the present study are grouped into seven domains: socio-demographic (age, gender, educational level, employment status and patient organisation membership), lifestyles (physical activity, smoking status and alcohol consumption), patient-reported outcomes (disease activity, spinal stiffness and functional limitation), disease characteristics (diagnostic delay and symptom duration), extra-musculoskeletal manifestations (uveitis and inflammatory bowel disease) and treatments (non-steroidal anti-inflammatory drugs [NSAIDs], conventional synthetic disease-modifying antirheumatic drugs [csDMARDs] and biological disease-modifying antirheumatic drugs [bDMARDs]). The specific questionnaire variables, questions and categories/measures are described in table 1.

The main outcome of the present analysis was mental health as measured by the GHQ-12 which is a screening measure of common mental health disorders in the general population, including symptoms of anxiety, depression, social dysfunction and loss of confidence. The overall GHQ-12 has a range from 0 to 12.[15 16] The cut-off point at 3 indicates a risk of poor mental health (GHQ score ≥3).

The following patient-reported outcomes were collected:

- Spinal Stiffness Index: an index developed by the University of Seville specifically for the IMAS survey to assess the degree of spinal stiffness experienced by patients in the spinal column, distinguishing between the cervical, dorsal and lumbar areas. The index ranges between 3 and 12 points. Higher values of the index indicate greater spinal stiffness.[12]
- Functional Limitation Index: an index developed by the University of Seville specifically for the IMAS survey to assess the degree of limitation in 18 activities

Table 2 Baseline characteristics of International Map of Axial Spondyloarthritis patients with axial spondyloarthritis (N=5557 unless otherwise specified)

	Mean±SD or n (%)
	Total
Socio-demographic factors	
Age (years)	43.9±12.8
Gender, n: 5555 Female	3080 (55.4)
Educational level University	2569 (46.2)
Employment status, n: 5183	
Employed	2641 (51.0)
Temporary sick leave	653 (12.6)
Permanent sick leave	415 (8.0)
Retired or early retired	616 (11.9)
Unemployed	373 (7.2)
Homemaker	365 (7.0)
Student	120 (2.3)
Patient organisation membership	
Yes	2407 (43.3)
Lifestyle factors	
Physical activity, n: 5476	4468 (81.6)
Smoking, n: 5288	1128 (21.3)
Alcohol, n: 5462	1631 (29.9)
Patient-reported outcomes	
BASDAI (0–10), n: 5295	5.4±2.1
Spinal Stiffness Index (3–12), n: 5371	7.6±2.5
Functional Limitation Index (0–54), n: 5482	19.8±15.4
Disease characteristics	
Diagnostic delay (years), n: 5327	7.4±9.0
Symptom duration (years), n: 5421	17.1±13.3
Extra-musculoskeletal manifestations	
Uveitis, n=5050	1171 (23.2)
Inflammatory bowel diseases, n=5156	724 (14.0)
Treatments	
Use of NSAIDs, n: 4995	3921 (78.5)
Use of csDMARDs, n: 4922	2137 (43.4)
Use of bDMARDs, n: 5034	2456 (48.8)

BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; bDMARDs, biological disease-modifying antirheumatic drugs; csDMARDs, conventional synthetic disease-modifying antirheumatic drugs; NSAIDs, non-steroidal anti-inflammatory drugs.

of daily life. The index ranges between 0 and 54 points. Higher values of the index indicate greater functional limitation.[12]

- BASDAI: a self-administered questionnaire that evaluates disease activity in patients with axSpA. The overall BASDAI has a range from 0 to 10.[17] The cut-off point at 4 indicates active disease (BASDAI≥4).

Statistical analysis

For the primary analysis, we categorised all patients into two groups: (1) patients with indicators of poor mental health (GHQ-12≥3) and (2) patients with better mental health (GHQ-12<3). Mann-Whitney and χ^2 tests were used to compare the distributions between GHQ-12 groups and candidate variables. Univariable and multivariable logistic regression analysis was used to evaluate the relationship between poor mental health reported at the time of the survey (GHQ-12 score) and the following variables: age, gender, educational level, employment status, patient organisation membership, physical activity, smoking (excluding socially smokers), alcohol consumption (excluding occasionally consumption), disease activity, spinal stiffness index, functional limitation index, symptom duration and inflammatory bowel disease (figure 1). The ORs and corresponding 95% CIs were reported. SPSS V.26.0 was used to carry out the analysis.

RESULTS

The mean age was 43.9 years, more than half were females, 46.2% had completed university education and nearly 20% were on sick leave. 4 in 10 patients were members of patient organisations, the majority engaged in physical activity and between 20% and 30% were smokers and alcohol consumers. The mean for disease activity was 5.4, for spinal stiffness was 7.5 and for functional was 19.8. The mean of diagnostic delay and symptom duration were 7.4 and 17.1 years, respectively. Furthermore, 23.2% suffer from uveitis and 14.0% from Inflammatory bowel disease (IBD). With respect to treatments, 78.5% had taken NSAIDs and almost half had taken csDMARDs or (bDMARDs; table 2).

The total number of patients who completed the GHQ-12 scale was 5351 (figure 1). The Cronbach's alpha of GHQ-12 was 0.934 (being higher than 0.900 in all regions of IMAS). In these patients, the mean (±SD) GHQ-12 was 4.7 (±4.1) with 59.4% having signs of poor mental health (GHQ-12≥3). The prevalence of poor mental health was 69.9% in South Africa (n=146), 63.7% in Latin America (n=548), 60.8% in Europe (n=3287), 54.3% in North America (n=770), and 51.8% in Asia (n=600; figure 2). Overall, 40.5% and 37.2% of patients reported diagnoses of anxiety and depression, respectively.

In bivariate analysis, patients reporting poor mental health were more frequently younger, women, without university education, on sick leave or unemployed, non-members of patient organisations, reporting less physical activity, more smoking but less alcohol consumption, higher level of disease activity, greater levels of spinal stiffness and functional limitations, lower symptom duration and with a greater likelihood of inflammatory bowel disease (table 3). For all regions, poor mental health was

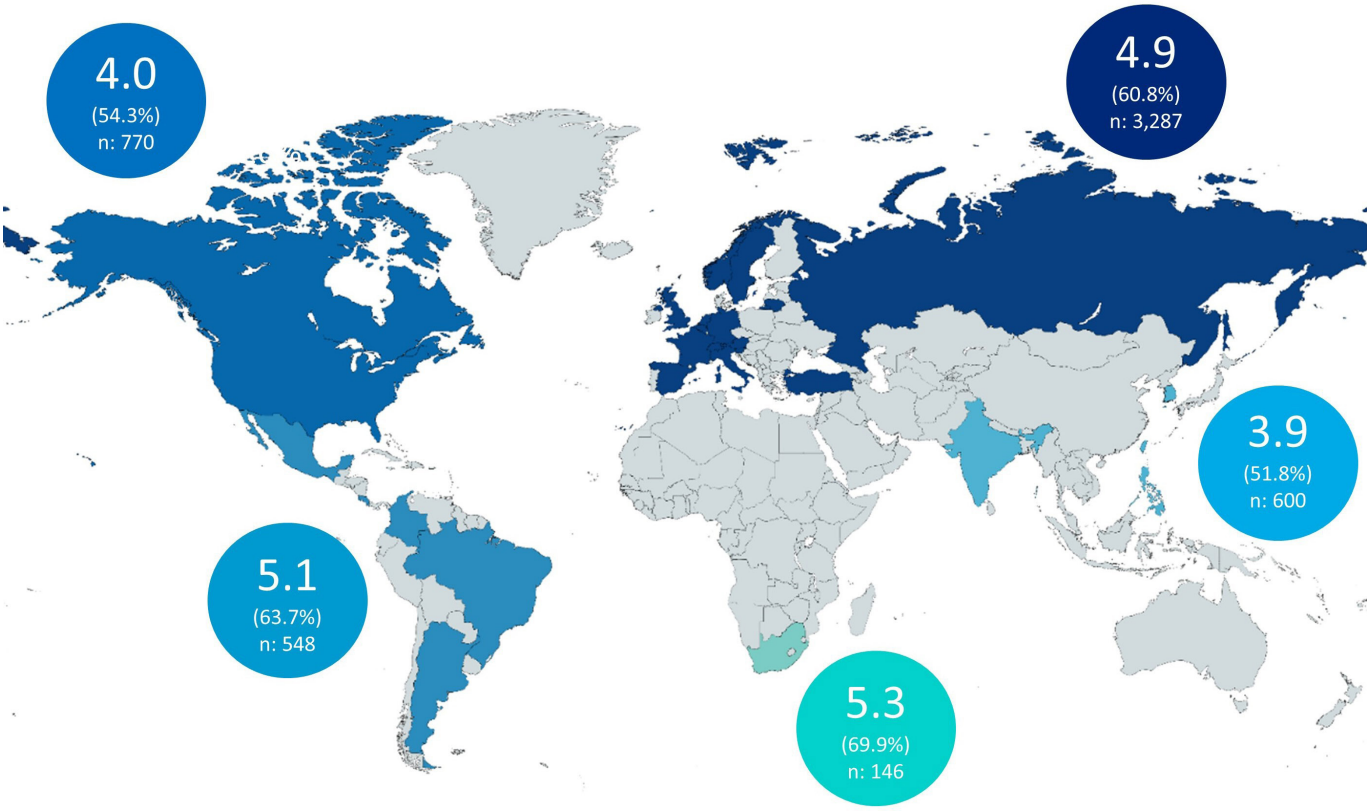

Figure 2 Mental health status (mean GHQ-12) and prevalence of poor mental health (GHQ-12 ≥3) for each region. Data shown in the circles refer to the mean of mental health (% poor mental health). GHQ-12, 12-item General Health Questionnaire.

more frequent in young patients and in patients with higher disease activity, although only in Europe and Latin America females experience worse mental health. Except for South Africa, spinal stiffness and functional limitation were associated with worse mental health in all regions (online supplemental table 1).

In the multivariable logistic regression, the factors associated with poor mental health were younger age (OR=0.99, 95% CI 0.98 to 0.99), female gender (OR=1.16, 95% CI 1.01 to 1.33), being on sick leave or unemployed (OR=1.63, 95% CI 1.39 to 1.91), non-physical activity (OR=1.22, 95% CI 1.01 to 1.47), smoking (OR=1.20, 95% CI 1.01 to 1.43), higher disease activity (OR=1.42, 95% CI 1.36 to 1.48), greater functional limitation (OR=1.02, 95% CI 1.01 to 1.02), and shorter symptoms durations (OR=0.98, 95% CI 0.98 to 0.99; table 4).

DISCUSSION

The present study assessed the mental health of 5351 patients with axSpA in the IMAS cohort from 27 countries around the globe. We evaluated mean mental health using a well-established screening instrument—the GHQ-12. The mean GHQ-12 was 4.7 and we found indicators of impaired mental health in 59.4% of the patients (GHQ-12≥3). The prevalence of poor mental health was higher in South Africa (69.9%), followed by Latin America (63.7%), Europe (60.8%), North America (54.3%) and Asia (51.8%). Furthermore, the factors associated with poor mental health were younger age, female gender, patients on sick leave or unemployed, non-physical activity, smoking, higher disease activity, greater functional limitation, and less symptom duration.

These results are consistent with a previous study in India, in which associated factors with anxiety and depression include younger age at disease onset, female gender, impact on work productivity, high disease activity and poor quality of life.[7] In the investigated sample of patients with axSpA, 40.8% reported a history of anxiety and 37.2% of depression. These global IMAS results are consistent with the EMAS subsample study which showed a 61% prevalence of poor mental health, 38% of anxiety and 36% of depression, confirming that mental health problems are prevalent across patients with axSpA, regardless of country and region of residence.[3] In the same vein, another study in Turkey showed that 44% of patients with axSpA reported depression and 22.5% anxiety.[18] In summary, around one-third of IMAS patients have a diagnosis of depression or anxiety, which confirms previous findings.[7] Patients from IMAS South Africa had the highest frequency of poor mental health while patients from Asia had the lowest. Furthermore, this prevalence of anxiety and depression in patients with axSpA from the IMAS cohort (40.8% and 37.2%, respectively) were higher than in the general population, even in the COVID-19 pandemic context (31.9% and 33.7%),[19] which shows the important impairment that patients with

Table 3 Bivariate analysis comparing patients with axial spondyloarthritis with and without signs of poor mental health (N=5351 unless otherwise specified)

	Mean±SD or n (%)		
	GHQ-12<3 2174 (40.6%)	GHQ-12≥3 3177 (59.4%)	P value*
Socio-demographic factors			
Age (years)	46.1±13.8	42.3±12.0	**<0.001**
Gender, n: 5349 Female	1058 (48.7)	1898 (59.8)	**<0.001**
Educational level University	1090 (50.1)	1413 (44.5)	**<0.001**
Employment status, n: 4997			**<0.001**
Employed	1145 (55.3)	1405 (48.0)	
Temporary sick leave	213 (10.3)	427 (14.6)	
Permanent sick leave	119 (5.8)	275 (9.4)	
Retired or early retired	310 (15.0)	281 (9.6)	
Unemployed	78 (3.8)	273 (9.3)	
Homemaker	166 (8.0)	188 (6.4)	
Student	38 (1.8)	79 (2.7)	
Patient organisation membership Yes	992 (45.6)	1341 (42.2)	**0.013**
Lifestyle factors			
Physical activity, n: 5270	1860 (86.1)	2504 (80.5)	**<0.001**
Smoking, n: 5175	346 (16.5)	750 (24.4)	**<0.001**
Alcohol, n: 5349	719 (33.1)	893 (28.1)	**<0.001**
Patient-reported outcomes			
BASDAI (0–10), n: 5295	4.4±2.1	6.1±1.9	**<0.001**
Spinal Stiffness Index (3–12), n: 5302	7.1±2.5	7.9±2.4	**<0.001**
Functional Limitation Index (0–54), n: 5350	15.5±13.6	21.8±15.4	**<0.001**
Disease characteristics			
Diagnostic delay (years), n: 5240	7.4±9.1	7.4±8.9	0.134
Symptom duration (years), n: 5334	19.1±14.4	15.8±12.3	**<0.001**
Extra-musculoskeletal manifestations			
Uveitis, n=4844	487 (24.4)	683 (24.0)	0.764
Inflammatory bowel diseases, n=4950	259 (12.6)	465 (16.0)	**0.001**
Treatments			
Use of NSAIDs, n: 4785	1521 (79.4)	2286 (79.7)	0.804
Use of csDMARDs, n: 4705	824 (43.7)	1275 (45.2)	0.298
Use of bDMARDs, n: 4828	956 (49.2)	1426 (49.4)	0.901

*Bold p-values indicate statistical significance
BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; bDMARDs, biological disease-modifying antirheumatic drugs; csDMARDs, conventional synthetic disease-modifying antirheumatic drugs; GHQ-12, 12-item General Health Questionnaire; NSAIDs, non-steroidal anti-inflammatory drugs.

axSpA suffer in relation to their mental health and the needed to refer patients with poor disease outcomes to the psychologist with the aim to improved their quality of life.

In the IMAS cohort, younger patients reported poorer mental health. These results are consistent with previous studies in which younger patients had worse mental health and greater presence of psychological comorbidities.[3] This could be partly due to the fact that, as patients age, they are better able to cope with their condition and adapt their lives to their functional limitations. Moreover, this statement makes more sense if we consider that

Table 4 Logistic regression analysis of demographic, socioeconomic disease-related factors with poor mental health (12-item General Health Questionnaire ≥3; N=4335)

	Univariable logistic regression		Multivariable logistic regression	
	OR	95% CI	OR	95% CI*
Age	0.98	**0.97 to 0.98**	0.99	**0.98 to 0.99**
Gender: female	1.57	**1.40 to 1.75**	1.16	**1.01 to 1.33**
Educational level: no university	1.26	**1.13 to 1.40**	0.96	0.84 to 1.11
Employment status: sick leave or unemployed	2.02	**1.77 to 2.31**	1.63	**1.39 to 1.91**
Patient organisation membership: no	1.15	**1.03 to 1.28**	0.95	0.83 to 1.10
Physical activity engagement: no	1.49	**1.28 to 1.74**	**1.22**	**1.01 to 1.47**
Smoking: yes	1.63	**1.42 to 1.88**	**1.20**	**1.01 to 1.43**
Alcohol consumption: yes	0.79	**0.70 to 0.89**	1.03	0.89 to 1.20
BASDAI (0–10)	1.52	**1.48 to 1.57**	**1.42**	**1.36 to 1.48**
Spinal Stiffness Index (3–12)	1.15	**1.12 to 1.18**	1.03	0.99 to 1.07
Functional Limitation Index (0–54)	1.03	**1.03 to 1.03**	**1.02**	**1.01 to 1.02**
Symptom duration, years	0.98	**0.98 to 0.99**	**0.98**	**0.98 to 0.99**
Inflammatory bowel disease	1.32	**1.12 to 1.56**	1.01	0.83 to 1.23

*Bold 95%CI indicate statistical significance
BASDAI, Bath Ankylosing Spondylitis Disease Activity Index.

IMAS patients with shorter symptom duration are associated with poorer mental health in univariable logistic regression analysis. This relationship could be due to uncertainty about the disease progression and its consequences on patients' daily lives. However, in the general population, 20% of adolescents may experience a mental health issue in a given year,[20] a prevalence that could increase if these young people suffer from a chronic illness that will condition them for life.[21] Therefore, these results shown in IMAS patients about a significant association between younger age and poorer mental health highlight the need to assess the mental health of those younger patients, as having axSpA may aggravate their mental health.

Furthermore, compared with males, female patients with axSpA in the IMAS cohort were associated with poorer mental health. These results are in line with a recent study in which the female gender was associated with a greater likelihood of having a diagnosis of psychiatric illness in patients with axSpA.[18]

In addition, being on sick leave or unemployed was associated with worse mental health in the IMAS cohort. In this regard, in the absence of specific studies assessing the impact of employment on mental health in patients with axSpA, a study in patients with chronic diseases showed that economic and employment difficulties significantly increase the likelihood of mental disorders.[8] The only results in patients with axSpA derive from IMAS subsamples, such as the European population-based study (EMAS) that showed an association between unemployment or sick leave and mental health problems,[3] this study confirms the previous findings at the global level.

IMAS patients with harmful habits such as non-physical activity and smoking behaviour were associated with poor mental health. In this context, a recent study has shown that reporting unhealthy lifestyle factors such as smoking was associated with worse physical and mental health in patients with axSpA.[22] Individualised and coordinated interventions of the patients' life habits are necessary to detect possible cases of poor mental health and to make an early referral to a psychologist.

Higher disease activity in the IMAS cohort was associated with worse mental health. However, this relationship is likely to be bi-directional as worsening mental health could also impact disease activity.[19] This may be due to patients with higher disease activity feeling more anxious and distressed by pain, fatigue and stiffness. Furthermore, greater functional limitation was associated with worse mental health in patients from IMAS. In this context, patients with axSpA with persistent pain and functional limitations are likely to suffer from stress, anxiety and depression.[7]

Moreover, in the univariable logistic regression, patients with the presence of inflammatory bowel disease were associated with worse mental health in the IMAS cohort. These results are in line with other studies in which the prevalence or self-reported presence of inflammatory bowel disease was higher in patients with moderate-to-severe depressive symptoms,[23] in some cases triggering aggressive inflammatory bowel disease.[24]

As we have shown, 59.4% of patients had poor mental health as measured by the GHQ-12, although only 40.5% and 37.2% were diagnosed with anxiety or depression, with the proportion of patients with at least one of the two mental

comorbidities being 40.6%. Therefore, these differences in the proportions reveal the presence of almost 20% of cases of undiagnosed mental comorbidities. However—regionally—this difference between the real and expected diagnosis of mental health disorders was less than 7% in the Americas and South Africa, while in Europe and Asia it was close to 23%. The spectrum of mental disorders includes not only the common mental disorders such as anxiety and depression but also other severe disorders such as bipolar disorder, dysthymia, panic disorder, agoraphobia, specific phobia, social phobia, obsessive-compulsive disorder, schizophrenia, anorexia and bulimia.[25] Therefore, this difference may be due to these unexplored issues. This information could show the disparities between the diagnoses made and the reality of patients' mental health.

It is essential to address these issues from a multidisciplinary and holistic approach, including specialist medical treatment to manage physical symptoms, as well as specialist psychological support to help patients to cope with the unmet needs of the condition including the emotional challenges. Therefore, IMAS has identified factors that could be related to poor mental health such as patient profile (younger patients, women and unemployed or on sick leave), unhealthy lifestyle habits (not physically active and smokers)—as well as disease burden (higher disease activity and functional limitation). These features could be identified by rheumatologists at the visits of their patients with axSpA—at least once a year—in order to assess whether the patients might be suffering from mental problems and refer them to the specialist, in this case, the psychologist.

In addition, an adequate welfare system, emotional and psychological support through relevant therapies are essential to improve patients' quality of life. Patient organisations, as well as the support of family and friends, providing social support is likely to impact positively on psychological health (including also stress, anxiety or depression) and emotional well-being.

Both the Spanish Atlas study,[11] the European study (EMAS)[3] and the international study (IMAS) found that patients with poorer mental health are associated with worse disease activity and functional limitation. Therefore, the physical health status of the patient—coupled with the rest of the factors discussed above—could be a key biomarker for the evaluation and optimal referral of patients with axSpA to specialists in the mental health sector.

Regarding the type of scale to assess the mental health of patients with axSpA, we selected the GHQ-12 scale as it is an effective measure of screening for assessing the psychological and detecting non-psychotic psychiatric problems, compared with other scales such as the Short Form 36 (SF-36), which is less specific as it covers dimensions such as physical functioning, role limitations as a result of physical problems, bodily pain, general health perception, vitality, social functioning, role limitations due to emotional problems and mental health.

IMAS is the largest survey of patients with axSpA, including 5557 respondents from 27 countries worldwide, making it the largest sample and coverage to date. This study includes a significant number of factors associated with mental health, the identification and management of which may help to improve health outcomes. We recommend the attention and psychological management of patients with axSpA by psychologists to improve psychological outcomes including quality of life. We acknowledge that IMAS has some limitations. First, the survey was based on self-reported data and we are unable to confirm the patients' diagnosis by a physician. Likewise, information on mental comorbidities were self-reported by patients. Patient recruitment by Ipsos and patient organisations is another limitation of the study. Although it is worth noting that the patient organisations included members who are not as frequently treated by rheumatology units and therefore this sample could be more representative and closer to reality or at least complete the information from multicentre studies, which include patients who are being treated more frequently and do not always represent the reality of the patient. However, the characteristics of the included patients with axSpA correspond to the characteristics of other large cohort studies.[26] Although the GHQ-12 questionnaire has been shown to be valid in many countries around the world for assessing mental health in different populations, this questionnaire is not specific for patients with axSpA, which is a limitation of the study. In addition, the use of non-validated scales or indices to assess functional limitations in activities of daily living and spinal stiffness should be considered when assessing the results. Another limitation of the study is the elimination of the key factors such as HLA-B27 test and the presence of psoriasis due to the fact that they reduced significantly the sample size of the multivariable regression analysis, although these factors were only associated with worse mental health in the univariable regression analyses. Finally, there is an over-representation of the European region compared with other regions such as Asia or South Africa.

Conclusions

Globally, 6 in 10 patients with axSpA reported signs of poor mental health, with some regional differences around the globe. Around one-third of IMAS patients have an indication of being at risk of depression and anxiety, which confirms previous findings from the European EMAS subanalysis. Factors such as younger age, employment difficulties and disease burden were associated with poor mental health. A holistic approach that encompasses both physical and mental health is essential to improve the quality of life and mental health of patients with axSpA.

Author affiliations
[1]Health & Territory Research (HTR), Universidad de Sevilla, Seville, Spain
[2]Patient Advocacy, Spanish Federation of Spondyloarthritis Patient Associations (CEADE), Madrid, Spain
[3]Department of Rheumatology, IdiPaz, Hospital Universitario La Paz, Madrid, Spain
[4]Department of Rheumatology, Charité - Universitätsmedizin Berlin, Berlin, Germany
[5]Department of Rheumatology, German Rheumatology Research Centre, Berlin, Germany
[6]Department of Rheumatology, Sanatorio Julio Mendez, Buenos Aires, Argentina
[7]Patient Advocacy, Cyprus League of People with Rheumatism (CYLPER), Nicosia, Cyprus

[8]Department of Rheumatology, Mumbai Arthritis Clinic, Mumbai, India
[9]Patient Advocacy, Axial Spondyloarthritis International Federation (ASIF), London, UK
[10]Patient Advocacy, Canadian Spondylitis Association (CSA), Toronto, Ontario, Canada
[11]Department of Rheumatology, Cardiff University, Cardiff, UK

Acknowledgements We would like to thank all people with axial spondyloarthritis and patient organisations who participated in the International Map of Axial Spondyloarthritis study.

Contributors All authors had full access to all study data, participated in the drafting and revision of the article and approved the final version to be published. MG-C acts as the guarantor of this work

Funding This study was supported by Novartis.

Map disclaimer The inclusion of any map (including the depiction of any boundaries therein), or of any geographical or locational reference, does not imply the expression of any opinion whatsoever on the part of BMJ concerning the legal status of any country, territory, jurisdiction or area or of its authorities. Any such expression remains solely that of the relevant source and is not endorsed by BMJ. Maps are provided without any warranty of any kind, either express or implied.

Competing interests MG-C: Grant/research support from: Novartis. VN-C: Speakers bureau: AbbVie, Eli Lilly, Janssen, MSD, Novartis, Pfizer, UCB Pharma, Consultant of: AbbVie, Eli Lilly, Galapagos, MoonLake, MSD, Novartis, Pfizer, UCB Pharma, Grant/research support from: AbbVie, Novartis. DP: Speakers bureau: AbbVie, BMS, Celgene, Janssen, Lilly, MSD, Novartis, Pfizer, Roche and UCB, Grant/research support from: AbbVie, MSD, Novartis, and Pfizer. FS: Speakers bureau: AbbVie, Eli Lilly, Janssen, Novartis, Consultant of: AbbVie, Novartis, Janssen. SM: Consultant of: Novartis, GSK and Bayer. JC-F: None declared. SA: Speakers bureau: Pfizer, Novartis, Eli Lilly, Jansen. JL: Grant/research support from: No personal funding, but ASIF has received funding from Novartis, UCB, Lilly, AbbVie, Boehringer Ingelheim, Pfizer, Janssen. EK: None declared. Laura Christen: Employee of: Novartis employment and stock ownership. CB: Speakers bureau: AbbVie, Celgene, Janssen, Lilly, Novartis and Pfizer.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval The present manuscript does not contain any studies with animal subjects. All participants were asked to provide explicit opt-in consent prior to participating in the International Map of Axial Spondyloarthritis survey. Furthermore, the participants' data were anonymised and did not contain confidential, personal or subject-identifying information. Ethical aspects related to data extracted from patients and their treatment were in accordance with the Declaration of Helsinki. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

ORCID iDs
Marco Garrido-Cumbrera http://orcid.org/0000-0001-9727-1189
Victoria Navarro-Compán http://orcid.org/0000-0002-4527-852X
Denis Poddubnyy http://orcid.org/0000-0002-4537-6015

REFERENCES

1 Sieper J, Poddubnyy D. Axial Spondyloarthritis. *Lancet* 2017;390:73–84.
2 Navarro-Compán V, Sepriano A, El-Zorkany B, *et al*. Axial Spondyloarthritis. *Ann Rheum Dis* 2021;80:1511–21.
3 Garrido-Cumbrera M, Gálvez-Ruiz D, Delgado-Domínguez CJ, *et al*. Impact of Axial Spondyloarthritis on mental health in Europe: results from the EMAS study. *RMD Open* 2021;7:e001769.
4 Meesters JJL, Petersson IF, Bergman S, *et al*. Sociodemographic and disease-related factors are associated with patient-reported anxiety and depression in Spondyloarthritis patients in the Swedish Spascania cohort. *Clin Rheumatol* 2014;33:1649–56.
5 Xu X, Shen B, Zhang A, *et al*. Anxiety and depression correlate with disease and quality-of-life parameters in Chinese patients with Ankylosing Spondylitis. *Patient Prefer Adherence* 2016;10:879–85.
6 Walsh JA, Magrey M. Clinical manifestations and diagnosis of Axial Spondyloarthritis. *J Clin Rheumatol* 2021;27:e547–60.
7 Narendra Reddy K, Sabu N, Pandey N, *et al*. Anxiety and depression among patients with Axial Spondyloarthritis. *Eur J Rheumatol* 2022;9:8–13.
8 Verhaak PFM, Heijmans MJWM, Peters L, *et al*. Chronic disease and mental disorder. *Soc Sci Med* 2005;60:789–97.
9 Dube CE, Lapane KL, Ferrucci KA, *et al*. Personal experiences with diagnostic delay among Axial Spondyloarthritis patients: A qualitative study. *Rheumatol Ther* 2021;8:1015–30.
10 Qaiyum Z. Exploration of a non-linear relationship between diagnostic delay and Axial Spondyloarthritis quality-of-life measures. 2022. Available: https://tspace.library.utoronto.ca/handle/1807/125000
11 Garrido-Cumbrera M, Delgado-Domínguez CJ, Gálvez-Ruiz D, *et al*. The effect of Axial Spondyloarthritis on mental health: results from the Atlas. *J Rheumatol* 2019;46:1284–9.
12 Garrido-Cumbrera M, Poddubnyy D, Gossec L, *et al*. The European map of Axial Spondyloarthritis: capturing the patient perspective—an analysis of 2846 patients across 13 countries. *Curr Rheumatol Rep* 2019;21:19.
13 Garrido-Cumbrera M, Poddubnyy D, Sommerfleck F, *et al*. International Map of Axial Spondyloarthritis (IMAS): results from the perspective of 5557 patients from 27 countries around the globe.. *RMD Open* 2024.
14 Ipsos. Global Market Research and Public Opinion Specialist, Available: https://www.ipsos.com/en
15 Goldberg D. The Detection of Psychiatric Illness by Questionnaire; a Technique for the Identification and Assessment of Non-Psychotic Psychiatric Illness. London: Oxford University Press, 1972.
16 Hankins M. The reliability of the twelve-item general health questionnaire (GHQ-12) under realistic assumptions. *BMC Public Health* 2008;8:355.
17 Garrett S, Jenkinson T, Kennedy LG, *et al*. A new approach to defining disease status in Ankylosing Spondylitis: the bath Ankylosing Spondylitis disease activity index. *J Rheumatol* 1994;21:2286–91.
18 Kilic G, Kilic E, Ozgocmen S. Relationship between psychiatric status, self-reported outcome measures, and clinical parameters in Axial Spondyloarthritis. *Medicine (Baltimore)* 2014;93:e337.
19 Salari N, Hosseinian-Far A, Jalali R, *et al*. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health* 2020;16:57.
20 World Health Organization (WHO). ADOLESCENT MENTAL HEALTH - mapping actions of nongovernmental organizations and other International development organizations. 2012. Available: http://www.who.int/about/licensing/copyright_form/en/index.html
21 Redeker I, Hoffmann F, Callhoff J, *et al*. Determinants of psychological well-being in Axial Spondyloarthritis: an analysis based on linked claims and patient-reported survey data. *Ann Rheum Dis* 2018;77:1017–24.
22 Mogard E, Bremander A, Haglund E. A combination of two or more unhealthy Lifestyle factors is associated with impaired physical and mental health in patients with Spondyloarthritis: a cross-sectional study. *BMC Rheumatol* 2022;6:29.
23 Turner J, Kelly B. Emotional dimensions of chronic disease. *West J Med* 2000;172:124–8.
24 Kochar B, Barnes EL, Long MD, *et al*. Depression is associated with more aggressive inflammatory bowel disease. *Am J Gastroenterol* 2018;113:80–5.
25 Anjara SG, Bonetto C, Van Bortel T, *et al*. Using the GHQ-12 to screen for mental health problems among primary care patients: psychometrics and practical considerations. *Int J Ment Health Syst* 2020;14:62.
26 van Lunteren M, van der Heijde D, Sepriano A, *et al*. Is a positive family history of Spondyloarthritis relevant for diagnosing Axial Spondyloarthritis once HLA-B27 status is known *Rheumatology (Oxford)* 2019;58:1649–54.