



Psychological distress is frequently experienced by patients with axSpA, with some studies reporting that more than 50% of patients have concomitant depression or anxiety (Zou et al. 2016; Kilic et al. 2014; Shen et al. 2016; Hakkou et al. 2013; Meesters et al. 2014a). The exact mechanisms that lead to poor psychological status are not completely understood. It seems intuitive that the common symptoms of axSpA such as loss of mobility, stiffness, chronic pain, and fatigue, and their resultant interference with many aspects of daily functioning, including recreational activities, work, family life, and relationships are involved (Yang et al. 2016). Appreciation of the mental health of patients with axSpA is an important facet of their overall care as it can have a significant impact on response to treatment (Kilic et al. 2014).

In this chapter, the psychological health of the participants in IMAS will be described and the role of sociodemographic variables, clinical characteristics, and exercise in psychological health examined.

## 7.1 Overall Psychological Health

The psychological health of the European IMAS population was generally poor across the majority of participating countries (**Supplemental Fig. 7.1**). The mean ( $\pm$ SD) GHQ-12 score amongst 2,640 participants was 5.0 ( $\pm$ 4.1) and 62% of survey participants declared a GHQ-12 higher than 3, signifying a risk of psychological distress (Banks 1983).

IMAS participants at risk of psychological distress also reported a higher mean ( $\pm$ SD) number of psychological comorbidities than those at lower risk ( $1.3 \pm 1.2$  vs.  $0.5 \pm 0.8$ ; Mann–Whitney test  $p$ -value  $< 0.001$ ). Many participants reported

---

**Supplementary Information** The online version contains supplementary material available at [https://doi.org/10.1007/978-3-030-97606-4\\_7](https://doi.org/10.1007/978-3-030-97606-4_7).

trouble sleeping (50.5%), anxiety (38.6%) and depression (33.9%), and the mean number of visits to a psychiatrist and/or psychologist over the past 12 months was 2.5 in the 1,235 participants who answered this question.

Given the high burden on mental health reported in this study, a mean of 2.5 visits to a psychiatrist and/or psychologist could be seen as being low. In general, psychotherapies based on cognitive-behavioral techniques for anxiety or depression would require between 8 and 20 sessions of individual therapy (Widnall et al. 2020). In this context, the findings of our survey suggest that either the psychological interventions being employed are too short to improve health outcomes, or that European axSpA patients are heavily relying on psychiatric care. As an effective psychiatric care would require at least three sessions a year (one for setting the treatment, one or two for short-term monitoring and one for long-term follow-up), one may hypothesize that European axSpA patients are not getting sufficient treatment for their psychological health.

Data on visits to mental health professionals of axSpA patients are scarce. A cross-sectional study in Spain reported that, in the 2-year period prior to the survey, only 2.1% of patients sought psychiatric care and only 0.9% sought psychological care (Jovani et al. 2012).

These findings highlight the significant toll of axSpA on psychological health. A holistic approach to care is therefore necessary when treating axSpA, taking into consideration psychological as well as physical symptoms (Packham 2018).

Poor sleep is a common complaint in patients with axSpA, with a recent systematic literature review indicating that 35–90% of patients experience this symptom (Leverment et al. 2017). Poor sleep in axSpA is associated with poorer quality of life, general health, mood, and work-related measures (Wadeley et al. 2018) and thus further efforts are required in clinical practice to assess and treat this common and often under-appreciated symptom. A meta-analysis of 16 axSpA studies found a prevalence of depression of 11–64% (Zhao et al. 2018), while anxiety was evident in 40% of patients with axSpA in a recent Chinese single-center study (Zou et al. 2016). These prevalence rates, like those reported in the IMAS survey, are in stark contrast to the background WHO prevalence rates in countries participating in IMAS, where anxiety ranged from 3.1–7.4% and depression from 4.5–5.5%. Recognizing and treating these common psychological comorbidities promptly in patients with axSpA is vital for ensuring an optimal outcome (Kilic et al. 2014).

---

## **7.2 Further Research is Required to Investigate the Link Between Sociodemographic Factors and Psychological Health in axSpA to Aid Identification of At-Risk Groups**

The relationship between psychological health and a number of sociodemographic variables was assessed in IMAS, with significant associations identified between GHQ-12 score and age, gender, marital status, and income (Table 7.1;

**Table 7.1** Mean General Health Questionnaire (GHQ)-12 score of survey participants in subgroups stratified by sociodemographic variables

	N	Median	Mean	SD
Overall	2,640	4.0	5.0	4.1
<i>Age (years)<sup>a</sup></i>				
18–34	656	5.0	5.5	3.9
35–51	1,278	5.0	5.3	4.2
52–68	624	2.0	4.0	4.1
69–85	82	1.0	2.5	3.1
<i>Gender<sup>b</sup></i>				
Male	1,018	3.0	4.2	4.2
Female	1,622	5.0	5.3	4.1
<i>Schooling<sup>c</sup></i>				
No schooling completed	29	6.0	6.0	4.3
Primary school	226	5.0	5.3	4.3
High school	1,081	4.0	5.0	4.2
University	1,304	4.0	4.8	4.1
<i>Marital status<sup>d</sup></i>				
Single	565	5.0	5.2	4.1
Married	1,786	4.0	4.8	4.1
Separated/divorced	255	5.0	5.6	4.3
Widowed	34	4.0	4.7	3.8
<i>Income (monthly)<sup>a</sup></i>				
No income	43	8.0	6.7	3.7
€500 or less	559	6.0	6.1	4.3
€501–1,000	752	4.0	4.9	4.0
€1,001–1,500	441	4.0	4.6	4.1
€1,501–2,000	288	3.0	3.9	3.9
€2,001–3,000	151	2.0	3.3	3.5
€3,001–5,000	42	3.0	3.6	3.4
€5,001 or over	13	2.0	3.6	4.0
<i>Patient organization membership<sup>e</sup></i>				
Yes	1,033	4.0	4.7	4.0
No	1,607	5.0	5.1	4.2

SD standard deviation, GHQ-12 12-item General Health Questionnaire

<sup>a</sup> Kruskal–Wallis test p-value was < 0.001 indicating an association between age categories and GHQ-12 score

<sup>b</sup> Mann–Whitney test p-value was < 0.001 indicating an association between gender and GHQ-12 score

<sup>c</sup> Kruskal–Wallis test p-value was 0.196 indicating no relation between level of schooling and GHQ-12 score

<sup>d</sup> Kruskal–Wallis test p-value was 0.006 indicating an association between marital status and GHQ-12 score

<sup>e</sup> Mann–Whitney test p-value was 0.036 indicating an association between being member of a patient organization and GHQ-12 score

**Supplemental Fig. 7.2).** Psychological health was worse in participants who were younger, female, single or separated/divorced, and those who had lower income. In a previously reported analysis among the subset of patients from Spain included in IMAS, bivariate analysis of sociodemographic factors similarly found an association between having no partner and worse mental health, but in contrast patients who were older or male had worse mental health (Garrido-Cumbrera et al. 2019).

While the relationship between sociodemographic factors and psychological health is well characterized in rheumatoid arthritis (Geenen et al. 2012), there is a relative lack of research on this in axSpA. A relationship between psychological health and income is in agreement with a recent German study that identified lower income as a significant risk factor for poorer psychological well-being in patients with axSpA (Redeker et al. 2018). However, previous studies have not shown a relationship between age and psychological health (Zou et al. 2016; Martindale et al. 2006), or between gender and psychological health (Webers et al. 2016). Furthermore, there is no other evidence linking marital status with psychological health. A previous study in 316 patients with axSpA identified lower education level as an independent risk factor for anxiety and depression, in contrast to the results presented here (Kilic et al. 2014). The reasons for these discrepancies are unclear but may be due to the use of GHQ-12 in the IMAS questionnaire as opposed to alternative measures of psychological health in other studies or due to the comparatively large sample size in IMAS versus previous studies.

---

### 7.3 Psychological Health and Clinical Characteristics

Significant relationships were observed between GHQ-12 score and BASDAI, Spinal Stiffness Index, Functional Limitation Index, and diagnostic delay (Table 7.2).

Generally, a higher GHQ-12 score was associated with higher disease activity and spinal stiffness, a greater degree of functional impairment (the limitation experienced in independently carrying out daily activities), and a longer diagnostic delay (Table 7.3). Furthermore, a higher proportion of participants with active disease (BASDAI  $\geq$  4) were at risk of psychological distress than those with inactive disease (BASDAI  $<$  4; **Supplemental Table 7.1**), and GHQ-12 score was higher in patients with more severe spinal stiffness, regardless of the region of the spine affected (**Supplemental Table 7.2**).

Significant relationships were also observed between the number of psychological comorbidities (sleep disorders, anxiety, and depression) reported by participants and disease activity (BASDAI) and spinal stiffness (Spinal Stiffness Index) (Table 7.3). Participants with higher disease activity or more severe spinal stiffness had significantly higher numbers of psychological comorbidities than those with lower disease activity and less severe stiffness. This finding was confirmed in

**Table 7.2** Disease activity (BASDAI), spinal stiffness (Spinal Stiffness Index), and function (Functional Limitation Index) by GHQ-12 cut-off

	Mean	SD	N
<i>BASDAI<sup>a</sup></i>			
GHQ-12 < 3	4.6	2.0	986
GHQ-12 ≥ 3	6.0	1.8	1,598
<i>Spinal Stiffness Index</i>			
GHQ-12 < 3	7.3	2.5	1,016
GHQ-12 ≥ 3	8.1	2.4	1,624
<i>Functional Limitation Index<sup>a</sup></i>			
GHQ-12 < 3	15.2	14.3	1,015
GHQ-12 ≥ 3	21.9	16.0	1,624
<i>Diagnostic delay (years)<sup>a</sup></i>			
GHQ-12 < 3	7.1	8.7	989
GHQ-12 ≥ 3	7.7	8.4	1,576

BASDAI Bath Ankylosing Spondylitis Disease Activity Index, GHQ-12 12-item General Health Questionnaire, SD standard deviation

<sup>a</sup> Mann–Whitney test p-value was <0.001 indicating a relationship with GHQ-12 score

**Table 7.3** Associations (Pearson’s correlations) between GHQ-12 score or number of psychological comorbidities and select clinical characteristics

Relationship	r	p-value
<i>GHQ-12 score</i>		
BASDAI	0.405	<0.001
Spinal Stiffness Index	0.201	<0.001
Functional Limitation Index	0.268	<0.001
Diagnostic delay	0.053	0.007
<i>Number of psychological comorbidities</i>		
BASDAI	0.301	<0.001
Spinal Stiffness Index	0.253	<0.001

BASDAI Bath Ankylosing Spondylitis Disease Activity Index, GHQ-12 12-item General Health Questionnaire, *r* Pearson correlation coefficient

further analyses which showed that participants with active disease (BASDAI 4) had more psychological comorbidities than those with inactive disease (BASDAI < 4; **Supplemental Table 7.3**) and the number of psychological comorbidities was higher in patients with more severe spinal stiffness, regardless of the region of the spine affected (**Supplemental Table 7.4**).

These results highlight how various aspects of axSpA are interlinked. Impaired psychological well-being might affect a patient’s perception of disease activity, stiffness, or function. Conversely, higher disease activity, more severe stiffness, or greater functional impairment might lead to the development of psychological distress.

Results from previous clinical studies corroborate the IMAS data. In a German survey of 1,736 patients with axSpA, psychological well-being (assessed using WHO-5) was associated with both disease activity (BASDAI) and function (Bath Ankylosing Spondylitis Functional Index [BASFI]) (Redeker et al. 2018). Several other studies have also established a link between disease activity and functional limitation with measures of psychological health such as anxiety and depression (Zhao et al. 2018; Martindale et al. 2006; Webers et al. 2016; Meesters et al. 2014b). Frequently associated with pain and limited function and mobility (Sieper and Poddubnyy 2017), spinal stiffness has also been linked to impaired psychological health, although it is potentially less important than disease activity and functioning (Zhao et al. 2018; Martindale et al. 2006).

It is clear that psychological therapy should be included as part of routine axSpA care and may help patients better manage their disease symptoms and improve outcomes.

#### 7.4 Role of Physical Exercise in Symptomatic Relief and Mental Health Improvement of Patients with AxSpA

European IMAS participants who engaged in physical activity reported a modest but statistically significant reduction in GHQ-12 score compared with participants who were inactive (mean GHQ-12 4.8 vs. 5.6; Mann–Whitney test  $p$ -value < 0.001). Furthermore, participants who engaged in physical activity were at a decreased risk of psychological distress (Table 7.4).

All patients with axSpA should be encouraged to engage in exercise to help with symptomatic relief as well as for the well-documented beneficial effects on general mental health (Harvey et al. 2018; Heijde et al. 2017).

$\chi^2$  test  $p$ -value was 0.002 indicating an association between participation in physical activities and scoring above the cut-off point of GHQ.

**Table 7.4** Participation in physical activities and GHQ-12 cut-off point of survey participants

Participation in physical activities	GHQ-12 cut-off		Total
	<3	≥ 3	
<i>No</i>			
Frequency	182	375	557
%	32.7	67.3	100.0
<i>Yes</i>			
Frequency	834	1,249	2,083
%	40.0	60.0	100.0
<i>Total</i>			
Frequency	1,016	1,624	2,640
%	38.5	61.5	100.0

*GHQ-12* 12-item General Health Questionnaire

## 7.5 Conclusions

- A substantial proportion of European IMAS participants were at risk of psychological distress and had common psychological comorbidities such as sleep disorders, anxiety, and depression, highlighting the substantial negative impact of axSpA on psychological health.
- Participants who were younger, female, single or separated/divorced, and those who had lower income were most at risk of psychological distress.
- Psychological health was associated with disease activity, functional impairment, and spinal stiffness.
- Psychological care is an essential component of the holistic medical management of axSpA.

---

## References

- Banks MH. Validation of the general health questionnaire in a young community sample. *Psychol Med.* 1983;13:349–53.
- Garrido-Cumbrera M, Delgado-Domínguez CJ, Gálvez-Ruiz D, Mur CB, Navarro-Compán V; Atlas working group. The effect of axial spondyloarthritis on mental health: results from the atlas. *J Rheumatol.* 2019;46(10):1284–9.
- Geenen R, Newman S, Bossema ER, Vriezেকolk JE, Boelen PA. Psychological interventions for patients with rheumatic diseases and anxiety or depression. *Best Pract Res Clin Rheumatol.* 2012;26:305–19.
- Hakkou J, Rostom S, Mengat M, Aissaoui N, Bahiri R, Hajjaj-Hassouni N. Sleep disturbance in Moroccan patients with ankylosing spondylitis: prevalence and relationships with disease-specific variables, psychological status and quality of life. *Rheumatol Int.* 2013;33:285–90.
- Harvey SB, Overland S, Hatch SL, Wessely S, Mykletun A, Hotopf M. Exercise and the prevention of depression: results of the HUNT cohort study. *Am J Psychiatry.* 2018;175:28–36.
- Jovani V, Loza E, García de Yébenes MJ, et al. Variabilidad en el consumo de recursos en pacientes con espondiloartritis en España. Datos descriptivos preliminares del estudio emAR II. *Reumatol Clin.* 2012;8:114–9.
- Kilic G, Kilic E, Ozgocmen S. Relationship between psychiatric status, self-reported outcome measures, and clinical parameters in axial spondyloarthritis. *Medicine.* 2014;93:e337.
- Leverment S, Clarke E, Wadeley A, Sengupta R. Prevalence and factors associated with disturbed sleep in patients with ankylosing spondylitis and non-radiographic axial spondyloarthritis: a systematic review. *Rheumatol Int.* 2017;37:257–71.
- Martindale J, Smith J, Sutton CJ, Grennan D, Goodacre L, Goodacre JA. Disease and psychological status in ankylosing spondylitis. *Rheumatology (oxford).* 2006;45:1288–93.
- Meesters JJ, Bremander A, Bergman S, Petersson IF, Turkiewicz A, Englund M. The risk for depression in patients with ankylosing spondylitis: a population-based cohort study. *Arthritis Res Ther.* 2014a;16:418.
- Meesters JJ, Petersson IF, Bergman S, Haglund E, Jacobsson LT, Bremander A. Sociodemographic and disease-related factors are associated with patient-reported anxiety and depression in spondyloarthritis patients in the Swedish SpAScania cohort. *Clin Rheumatol.* 2014b;33:1649–56.
- Packham J. Optimizing outcomes for ankylosing spondylitis and axial spondyloarthritis patients: a holistic approach to care. *Rheumatology (Oxford).* 2018;57:vi29–vi34.

- 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.
- Shen CC, Hu LY, Yang AC, Kuo BI, Chiang YY, Tsai SJ. Risk of Psychiatric Disorders following Ankylosing Spondylitis: A Nationwide Population-based Retrospective Cohort Study. *J Rheumatol.* 2016;43:625–31.
- Sieper J, Poddubnyy D. Axial spondyloarthritis. *Lancet.* 2017;390:73–84.
- Van der Heijde D, Ramiro S, Landewe R, et al. 2016 update of the ASAS-EULAR management recommendations for axial spondyloarthritis. *Ann Rheum Dis.* 2017;76:978–91.
- Wadeley A, Clarke E, Leverment S, Sengupta R. Sleep in ankylosing spondylitis and non-radiographic axial spondyloarthritis: associations with disease activity, gender and mood. *Clin Rheumatol.* 2018;37:1045–52.
- Webers C, Essers I, Ramiro S, et al. Gender-attributable differences in outcome of ankylosing spondylitis: long-term results from the outcome in ankylosing spondylitis international study. *Rheumatology (oxford).* 2016;55:419–28.
- Widnall E, Price A, Trompeter H, Dunn BD. Routine cognitive behavioural therapy for anxiety and depression is more effective at repairing symptoms of psychopathology than enhancing wellbeing. *Cog Ther Res.* 2020;44:28–39.
- Yang X, Fan D, Xia Q, et al. The health-related quality of life of ankylosing spondylitis patients assessed by SF-36: a systematic review and meta-analysis. *Qual Life Res.* 2016;25:2711–23.
- Zhao S, Thong D, Miller N, et al. The prevalence of depression in axial spondyloarthritis and its association with disease activity: a systematic review and meta-analysis. *Arthritis Res Ther.* 2018;20:140.
- Zou Q, Jiang Y, Mu F, Shi Y, Fang Y. Correlation of Axial Spondyloarthritis with Anxiety and Depression. *Med Sci Monit.* 2016;22:3202–8.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

