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Original Investigation

Anxiety and Depression in Ankylosing Spondylitis: A Historical View☆

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ABSTRACT

Objective: To analyse the prevalence of psychological disorders (anxiety and depression symptoms) and evaluate their association with sociodemographic, clinical, functional ability and pain, in ankylosing spondylitis patients reviewed between January 1995 and December 1997.

Patients and methods: Cross-sectional study on 115 ankylosing spondylitis patients reviewed as outpatients. The medical history, functional capacity (Health Assessment Questionnaire modified for Ankylosing Spondylitis-HAQEA), depression (Geriatric Depression Scale-GDS), and anxiety (State-Trait Anxiety Inventory-STAI) was assessed. Laboratory and radiology tests were also performed.

Results: The mean age of patients was 40 years, and 84% were male. The mean score using HAQEA was 1 ± 0.7 (0-3 points), with 22% having symptoms of depression and 30% anxiety. The variables that best explained the variance in symptoms of anxiety and depression were functional ability, level of education, and entheses index.

Conclusions: Depression and anxiety are present in 1/3 of our patients with ankylosing spondylitis, and are mainly influenced by the functional limitation, painful entheses, and education.

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Ansiedad y depresión en la espondilitis anquilosante: una visión histórica

Palabras clave:
Espondilitis anquilosante
Ansiedad
Depresion

RESUMEN

Objetivo: Analizar la prevalencia de alteraciones psicológicas (síntomas de ansiedad y depresión) y evaluar su asociación con variables sociodemográficas, clínicas, capacidad funcional y dolor, en un grupo de pacientes con diagnóstico de espondilitis anquilosante revisados entre enero de 1995 y diciembre de 1997.

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Pacientes y métodos: Estudio transversal en 115 pacientes con espondilitis anquilosante revisados ambulatoriamente. A todos los enfermos se les realizó una historia clínica y se valoró la capacidad funcional mediante el cuestionario Health Assessment Questionnaire validado para la espondilitis anquilosante (HAQEA), depresión mediante el cuestionario Geriatric Depression Scale (GDS) y ansiedad por el cuestionario State Trait Anxiety Inventory (STAI). Además, se realizaron determinaciones analíticas y de imagen (radiología).

Resultados: La edad media de los pacientes era de 40 años y el 84% eran varones. La puntuación media del HAQEA fue de 1 ± 0,7 (0-3 puntos). El 22% presentó síntomas de depresión y el 30% de ansiedad. Las variables que mejor explicaban la varianza de los síntomas de ansiedad y depresión fueron la capacidad funcional, el nivel de estudios y el índice de entesis.

Conclusiones: Los síntomas de depresión y ansiedad están presentes en 1/3 de nuestros pacientes con espondilitis anquilosante y están influidos, principalmente, por la limitación funcional, entesis dolorosas y nivel de educación.

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Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory disease, of unknown etiology, that predominantly affects the axial skeleton and the sacroiliac joints. It may also involve peripheral joints, entheses and extra-articular structures.

Its prevalence is closely related to the positivity of the HLA-B27,[1] and it is around 0.5-1%.[2]

The functional disability that appears in advanced stages contributes to diminish the quality of life of these patients. There is a direct relationship between physical disability and psychological deterioration in chronic rheumatic diseases.[3-5]

The study of the psychological factor in rheumatic diseases has been traditionally focused on rheumatoid arthritis (RA),[6-9] and has been less valued in AS.[10-15]

Barlow found that 1/3 of patients with AS had depressive symptoms and they were more frequent in women. In addition, he evidenced that the patient with AS has less tendency to depression than other rheumatic patients.[15]

The majority of patients with AS refer pain, stiffness and fatigue as predominant symptoms and approximately 1/3 may have clinical depression.[16]

In this work we propose that in AS the psychological variables are modulated by clinical aspects of the disease. For this purpose, we intend to estimate the prevalence of psychological alterations (symptoms of anxiety and depression) and evaluate their association with socio-demographic and clinical variables, functional ability and pain, in a group of patients with a diagnosis of AS, who attended the consultation of Rheumatology of the Virgen de la Arrixaca University Clinical Hospital in Murcia, between January 1995 and December 1997.

Patients and Methods

In the Service of Rheumatology of the Virgen de la Arrixaca University Clinical Hospital in Murcia, there is a monographic consultation intended for patients with spondyloarthritis, which in 2015 turned 25 years since its creation. The patients are checked up with a periodicity between 3 months and one year, depending on the individual characteristics and the course of the disease.

In this study of cross-sectional design have been included all patients with AS, diagnosed according to the modified New York criteria,[17] aged ≥ 18 years. The inclusion period was 3 years (from January 1995 to December 1997), throughout which they were included as they consecutively attended the consultation. There were excluded those with other vertebral lesions of different nature than AS (septic spondylodiscitis, previous spinal surgery, metastasis, among others), coexistence of other disabling disease different from the AS, lack of completion of the questionnaires or physical examination, severe intellectual deficit or problems to understand and make themselves understood in the Spanish language, that would hinder the reading or understanding of the tests, previous diagnosis of anxiety or depression or any other psychiatric disorder and, finally, the absence of consent for their participation in the study.

All patients included (n = 115) were evaluated indistinctly by 2 rheumatologists and they gave their consent for the realization of the study; in addition, it was obtained the approval of the Ethics Committee of the hospital.

In the last 2 decades have emerged new instruments for clinimetric assessment of patients with AS, both for inflammatory activity (Bath Ankylosing Spondylitis Disease Activity Index [BASDAU][18] and Ankylosing Spondylitis Disease Activity Score [ASDAS])[19] and for physical function (Bath Ankylosing Spondylitis Functional Index [BASFI]),[20] regarding the classic indexed (modified Murphy's index of inflammatory activity[21] and Health Assessment Questionnaire modified for AS [HAQEA]).[22] However, in this study, whose data were collected in the middles of the decade of 1990s, we used the modified Murphy's index[21] and the HAQEA[22] to assess the inflammatory activity and the physical function, respectively, because at that time began to appear the first publications of the group of Calin et al. about the BASDAI[18] and BASFI[20] indexes, which were starting to be internationally validated.

The symptoms of depression and anxiety were evaluated using an abridged version of the Geriatric Depression Scale [GDS][23] adapted to the Spanish language and of the State-Trait Anxiety Inventory [STAI] questionnaire validated into Spanish, by the Trait-Anxiety subscale (T/A),[24] respectively.

At the time of the visit the complete anamnesis and the physical examination were carried out, and the questionnaires were completed. The laboratory tests were performed within the 2 weeks prior to the visit.

The modified Murphy's index[21] consists of 4 items: morning spinal stiffness (0: without stiffness, 1: ≤ 1 hour, 2: > 1 hour), consumption of nonsteroidal anti-inflammatory drugs in the last 2 weeks (1: without consumption of sporadic, 2: habitual consumption), presence of arthritis or uveitis (0: none, 1: previous in the last 2 months, 2: current) and nocturnal axial pain in the 2 last weeks (0: none, 1: occasional pain, 2: habitual pain).

The sum of the value assigned to each item allows to obtain a total score ranging from 1 to 8 in each patient.

The GDS[23] is a scale that was designed specifically for the elderly,[25] with the purpose of avoiding that the somatic symptoms prevail over the affective and cognitive in the assessment of depression. The original version consists of 30 items. We chose the reduced versión,[26] which consists of 15 items and has a format of dichotomous response (yes/no) that makes the completion fast and easy for the patient; in addition, it contains few somatic items, which favored its election. It has been validated in young adults[27] and used in patients with chronic rheumatic diseases.[28] The scoring is done by assigning a value of 1 to the answer that entails a depressive connotation and the value of 0 in the opposite case. The overall score can range between 0 and 15 points, setting the cut-off point in 7 (Appendix 1).

The symptoms of anxiety were assessed using the STAI questionnaire,[24] made up of separate scales that measure independent concepts, the anxiety state (S) and the T/A. The first makes reference to a transient and punctual emotional state or condition, which may vary over time and fluctuate in intensity. The T/A indicates a more steady anxious propensity by which the subjects differ in their tendency to perceive the situations as threatening. The scores can range from a minimum of 0 points to a maximum of 60. The scores were transformed, by the corresponding tables, in scales of centiles and decatypes, in order to make easy their statistical management. In our study, we used the STAI-Trait subscale (Appendix 2). The cut-off was set in 7 points, by virtue of which 2 groups were differentiated: patients with symptoms of anxiety (score higher than 7) and patients without symptoms of anxiety (score less than or equal to 7).

The entheses index is based on the degree of pain referred by the patient on the palpation of different points of tendinous insertion. In this work was followed the index developed by Mander, which includes 17 exploration areas.[29]

Statistical Analysis

The descriptive statistical analysis consisted in the description of qualitative variables using absolute numbers and percentages of the total, while the quantitative variables were described by means of measures of central tendency (mean or median) and dispersion (standard deviation or range).

The analysis consisted in a bivariate study to determine the possible association between each of the study variables and the outcome variable (depression and T/A) and multivariate for the study of the association with the variable outcome independent of other factors.

The bivariate analysis was based on the use of the Chi-square test for the qualitative variables or the Fisher's exact test when the expected frequencies were < 5 in ≥ 20% of the boxes.

For the quantitative variables, after checking the normality in their distribution by the Kolmogorov-Smirnov test and because they are independent data, we used the Student's t test. In addition, the association between them was studied using the Pearson correlation test.

The diverse measures selected to evaluate the clinical status of the patients were analyzed jointly by a multiple linear regression analysis, using an iterative "step by step" (stepwise) automatic selection method.

The statistical package SPSS 11.0 was used for the statistical analysis.

The determination of the confidence intervals (CI) was established at 95%, considering 5% as the level of statistical significance ($p < 0.05$).

Results

115 patients with AS (97 men and 18 women) were included.

The average age was 41 ± 11 years. 85% were married or lived together as a couple, and the remaining 15% included singles, widowed or separated. The average duration of the disease was 16 ± 10 years and the diagnostic delay was 9 years, with similar results in both sexes.

The HLA-B27 was positive in 77%.

37% had peripheral arthritis, highlighting the involvement of the hip (56% out of all the peripheral arthritis).

18% have had one or more episodes of anterior uveitis.

25% of the total were considered smokers.

41% of the patients had some degree of incapacity for work.

Assessment of the Functional Ability

The average score of the HAQEA was 1 ± 0.7 points.

We classified the patients into 3 groups according to the degree of functional limitation they had:

a) Without functional limitation (HAQEA 1): group formed by 25 patients (22%), with a score of less than 0.5 points (0.23 ± 0.16).
b) Moderate functional limitation (HAQEA 2): with 53 patients (46%), score between 0.51 and 1.50 (0.95 ± 0.29).
c) Significant functional limitation (HAQEA 3): constituted by the remaining 37 patients (32%), with a score higher than 1.50 (1.84 ± 0.25).

The activities related to the axial mobility, especially cervical, and those that involved forced or load-bearing postures

in the lower limbs were the ones that showed a higher degree of difficulty.

The patients who were older and those with a longer time of evolution of the disease showed a greater functional limitation.

Assessment of the Psychological Alterations

Depression

The average score of the GDS was 4.8 ± 3.4 points. 22% had symptoms of depression (GDS > 7).

The patients who had symptoms of depression had lower levels of studies (fewer years of schooling) and more hospitalizations due to the AS (mostly for prosthetic surgery of the hips). No statistically significant differences were found regarding the sex and age of the patient, years of evolution of the disease, degree of disability or presence of cardiovascular comorbidity. In addition, they had a greater inflammatory burden (activity, painful entheses and acute phase reactants), stiffness and functional limitation.

The GDS questionnaire showed a significant association with various demographic, clinical and functional variables related to the degree of activity and severity of the disease, and also with the presence of symptoms of anxiety. (Table 1).

Table 1 –Pearson Correlation Coefficients (r) Between the Scores of the GDS and the Analyzed Demographic and Clinical Variables (Bivariate Analysis)

Variables	r
Anxiety (STAI)	0,74*
Functional ability (HAQEA)	0,48*
Entheses index	0,37*
Years of study	–0,37*
Inflammatory activity	0,35*
Stiffness (VAS)	0,31*
Pain (VAS)	0,29*
FFD	0,29*
Lumbar lateral inflexion	–0,24**
Cervical rotation	–0,17 NS
Time of evolution	0,16 NS
Sacroiliac radiographic index	0,15 NS
Chest expansion	–0,13 NS
Occiput-wall distances	0,11 NS
ESR	0,11 NS
Schöber Test	–0,10 NS
Age of the patient	0,09 NS
Cervical radiographic index	–0,08 NS
Age at disease onset	–0,05 NS
Lumbar radiographic index	–0,03 NS

Inflammatory activity: assessed by the modified Murphy index; FFD: finger-floor distance; OWD: occiput-wall distance; VAS: visual analogue scale; GDS: Geriatric Depression Scale; HAQEA: questionnaire on functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis; Entheses index: Mander entheses index; CRI: cervical radiographic index (modified Taylor's index); LRI: lumbar radiographic index (Taylor's index); NS: non-significant; STAI: State-Trait Anxiety Inventory; ESR: erythrocyte sedimentation rate.
* $p < 0.01$.
** $p < 0.05$.

Table 2 – Multiple Linear Regression Analysis of the Depression in 115 Patients With AS, After Iterative Selection Using the Procedure by Successive Steps *(Stepwise)*

Step	Variable	Regression coefficient (β)	Cumulative R^2	F*
1	Functional ability (HAQEA)	0,38	0,23	32
2	Entheses index	0,20	0,26	18.8

AS: ankylosing spondylitis; HAQEA: questionnaire on functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis.
* Values of the partial Snedecor's F of the included variable. All significant steps with $p < 0.001$.

Subsequently, we carried out a multiple linear regression analysis to identify the socio-demographic and clinical variables that best explained the variation in the presence of symptoms of depression (GDS). A process of automatic selection was conducted through a procedure of successive steps *(stepwise)*. The multiple correlation coefficient obtained was 0.51 and it allowed to explain the 26% of the total variance of the scores of the GDS questionnaire. The variables that best explained the variance of the depressive symptoms were the functional ability and enthesitis (Table 2).

Anxiety

The average score of the STAI was 6 ± 2 points. 30% had symptoms of anxiety (STAI > 7).

The patients who had symptoms of anxiety had lower levels of studies (years of schooling), greater inflammatory activity, pain, stiffness and axial functional limitation. No association was found between the presence or absence of symptoms of anxiety and the sex, the age of the patient and the years of evolution of the disease.

The results of the STAI were significantly correlated with socio-demographic variables and with other related to the inflammatory activity, the functional ability and the presence of symptoms of depression (Table 3).

Subsequently, we carried out a multiple linear regression analysis to identify those clinical and socio-demographic variables that best explained the variation in the presence of symptoms of anxiety (STAI). A process of automatic selection was conducted through a successive steps procedure *(stepwise)*. The multiple correlation coefficient obtained was 0.54 and it allowed to explain the 29% of the total variance of the scores of the STAI questionnaire. The variables that best explained the variance of the symptoms of anxiety were the functional ability and the educational level (Table 4).

Association Between Psychological Alterations and Functional Ability

We aimed to know if there was an association between the presence of psychological distress (symptoms of anxiety and depression) and the functional ability in our patients with AS.

Table 3 – Pearson Correlation Coefficients (r) Between the Scores of the STAI Questionnaire and the Analyzed Demographic and Clinical Variables (Bivariate Analysis)

Variables	r
Depression (GDS)	0,74*
Functional ability (HAQEA)	0,50*
Years of study	–0,40*
Pain (VAS)	0,37*
Stiffness (VAS)	0,37*
Inflammatory activity	0,36*
Entheses index	0,26*
Cervical rotation	–0,23**
Finger-floor distance	0,20**
Lumbar lateral inflexion	–0,19**
Chest expansion	–0,15 NS
Sacroiliac radiographic index	0,11 NS
Occiput-wall distance	0,08 NS
Time of evolution	0,08 NS
Age of the patient	0,06 NS
Lumbar radiographic index	–0,04 NS
ESR	0,03 NS
Cervical radiographic index	–0,02 NS
Age at disease onset	–0,008 NS
Schöber Test	0,0009 NS

Inflammatory activity: assessed by the modified Murphy index; OWD: occiput-wall distance; VAS: visual analogue scale; GDS: Geriatric Depression Scale; HAQEA: questionnaire of functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis; entheses index: Mander entheses index; CRI cervical radiographic index (modified Taylor's index); LRI: lumbar radiographic index (Taylor's index); NS: no significance; STAI: State-Trait Anxiety Inventory; ESR: erythrocyte sedimentation rate.
* $p < 0.01$.
** $p < 0.05$.

As can be seen in Table 5, those patients with a significant functional disability (HAQEA 2 and 3) were also those who had greater symptoms of depression (28 and 30%, respectively, who had a score > 7 points in the GDS questionnaire), and the differences reached with respect to the group with less disability (HAQEA 1) were statistically significant ($p < 0.01$).

Table 4 – Multiple Linear Regression Analysis of Anxiety in 115 Patients With AS, After Iterative Selection Using the Procedure by Successive Steps *(Stepwise)*

Step	Variable	Regression coefficient (β)	Cumulative R^2	F*
1	Functional ability (HAQEA)	0,40	0,25	37
2	Years of study	–0,21	0,29	22

AS: Ankylosing spondylitis; HAQEA: questionnaire on functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis.
* Values of the partial Snedecor's F of the included variable. All significant steps with $p < 0.001$.

Table 5 – Association Between Symptoms of Depression and Functional Ability

	GDS ≤ 7 (n = 88)	GDS > 7 (n = 26)
HAQEA 1 (n = 24) (%)	24 (100)	0
HAQEA 2 (n = 53) (%)	38 (72)	15 (28)
HAQEA 3 (n = 37) (%)	26 (70)	11 (30)

GDS: Geriatric Depression Scale; HAQEA: questionnaire on functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis.
HAQEA 1: 0-0.5 points; HAQEA 2: 0.51-1.50 points; HAQEA 3: > 1.50 points. The statistical analysis was done by a χ^2 test.

In Table 6 we can observe that the patients with significant functional disability (HAQEA 2 and 3) showed symptoms of anxiety more frequently (32 and 42%, respectively, they had a score > 7 points in the STAI questionnaire). The differences found with respect to the group with less disability (HAQEA 1) reached statistical significance ($p < 0.05$).

The degree of correlation (Pearson correlation coefficient) between functional disability and psychological alterations was high ($r = 0.48$ for GDS and $r = 0.50$ for STAI, $p < 0.01$).

Association Between Pain and Psychological Alterations

We established the association between pain and sociodemographic (age of the patient, age at disease onset, time of evolution, level of studies), clinical (inflammatory activity, functional ability, entheses index, axial stiffness and metrology), analytical (erythrocyte sedimentation rate) and psychological (symptoms of anxiety and depression) variables. Subsequently, we carried out a multiple linear regression analysis to evaluate the variables that best explained the variation in the presence of pain in our patients with AS. A process of automatic selection by successive steps *(stepwise)* was conducted. The multiple correlation coefficient obtained was 0.79 and it allowed to explain the 63% of the total variance of the pain. The variables that best explained the variance of the pain were clinical (inflammatory activity, axial

Table 6 – Association Between Symptoms of Anxiety and Functional Ability

	STAI ≤ 7 (n = 78)	STAI > 7 (n = 34)
HAQEA 1 (n = 23) (%)	21 (91)	2 (9)
HAQEA 2 (n = 53) (%)	36 (68)	17 (32)
HAQEA 3 (n = 36) (%)	21 (58)	15 (42)

HAQEA: questionnaire on functional ability Health Assessment Questionnaire, validated for ankylosing spondylitis; STAI: State-Trait Anxiety Inventory.
HAQEA 1: 0-0.5 points; HAQEA 2: 0.51-1.50 points; HAQEA 3: > 1.50. The statistical analysis was done by a χ^2 test.

stiffness and functional ability), existing a weak correlation with psychological alterations.

Discussion

The evaluation of rheumatic diseases has been traditionally based on the study of physical variables. However, psychological factors can influence the expression of pain and the rest of the variables of physical nature in patients with arthritis.[3]

Most studies which evaluate psychological factors have been conducted in RA.[6-9]

The majority of patients with AS have pain and deterioration of the functional ability. These circumstances can determine alterations in the psychical sphere. Despite this, there are only few works available in which the psychological symptoms have been evaluated in these patients, as well as their relationship with socio-demographic, clinical, laboratory and radiological variables. One of the reasons that might explain this lack of studies is the fact that for a long time has been sustained, in an intuitive manner, that the patient with AS showed less tendency to have psychological alterations than others with other chronic rheumatic diseases such as RA. However, there are works that indicate that they may be more prevalent in this disease than was previously thought.[10-15]

In our series we found symptoms of depression in 22% and of anxiety in 30%.

If we review the literature, we find that the emotional problems are present in up to 20% of patients with AS, and are an important cause of disability.[30] Basler noted that more than 40% of his patients with AS had depressive symptoms,[31] a figure somewhat higher than that of Barlow, who also observes that these symptoms were more frequent among women who had a higher degree of pain.[15] Other authors demonstrated that the psychological factors exerted a great influence over the functional ability among spondylitic patients.[32] However, other works point out that the psychological assessment is undervalued in AS, since there are patients who deny the disease and its symptoms.[33] Ward finds that nearly 30% of his patients with AS have symptoms of anxiety and depression.[34]

To assess the symptoms of anxiety and depression, we used the T/A inventory of the STAI[24,35] and the GDS,[23] respectively, instead of other evaluation instruments such as the Hamilton Depression Rating Scale[36] or the Beck Depression Inventory,[37] because they are instruments of easy completion due to the small number of items, and of rapid correction and simple interpretation, which introduce few items of somatic character.

The GDS[23] is a scale initially designed for the geriatric population.[25] We chose the short version[26] because of its simplicity. It has been validated in the young population[27] and used in rheumatic diseases such as RA.[28]

The diagnosis, both of anxiety and depression, requires structured interviews and it should not be based on self-administered questionnaires. For this reason, in this study, starting from the data obtained, we make reference to the presence of symptoms of anxiety and depression, without entailing, initially, the establishment of a diagnosis that, of course, should be made in a structured manner by the relevant specialist.

With regard to the assessment of the disease activity and the physical function and quality of life, we used instruments in accordance with that time in the development of Medicine, such as the modified index of Murphy[21] and the HAQEA,[22] because when the data collection began, the first publications of the group of work of Calin regarding the BASDAI[18] and the BASFI[20] started to appear, these indexes began to be validated and then there were many doubts to be resolved, when there were introduced possible biases derived from the subjective perception of the patient regarding the evaluation of physical symptoms and their expression by means of visual-analogue scales, instead of Likert-type scales, which could not discriminate sufficiently between inflammatory and non-inflammatory conditions (for example, chronic pain conditions such as fibromyalgia). In addition, we had published in 1995 the validation of the HAQEA,[22] demonstrating its validity and reliability, which led us also to its management in this case.

Despite the fact that the results are similar to those found in the literature, it should be taken into account that the assessment tools that were used have been different, which might have introduced discrepancies regarding these works. Basler and Rehfisch[30] conducted a study applying cognitive-behavioral therapy for the control of pain in AS and observed that 45% of patients had depressive symptoms. For the assessment of the symptoms of anxiety they used the T/A subscale of the STAI, like us, however, for the symptoms of depression they handled a German depression scale.[38] Barlow[15] found that 1/3 of the patients with AS had high levels of depressive symptoms and that these were more frequent among women with higher levels of perceived pain, and for this purpose he used the Center for Epidemiological Studies Depression scale (CES-D).[39]

In our study, the physical function, the educational level and the presence of painful entheses have been the variables that best explained the symptoms of depression and anxiety. However, the regression model explains only 30% of the variance of the symptoms of depression and anxiety in our patients, and leaves 70% unexplained by the included variables, supporting the multidimensional nature of the mood disorders and the participation of variables of various kinds (genetic, environmental, among others) which are hardly controllable.

These results should be interpreted cautiously because of the methodological difficulties, among which stand out the measuring instruments used and the cross-sectional design of the study, in addition to the delay between the historical time of the data collection and the publication in the literature.

In summary, the symptoms of depression and anxiety are frequent in our patients with AS and are influenced, mainly, by the functional ability, the enthesitis, and the educational level of the patient.

Under all these considerations, we think that the psychological assessment should be introduced systematically in the follow-up of the patients with AS and in the evaluation of future longitudinal studies in the field of spondyloarthritis.

Ethical Disclosures

Protection of people and animals. The authors declare that no experiments were performed on human beings or animals for this research.

Data confidentiality. The authors state that patient data do not appear in this article.

Right to privacy and informed consent. The authors state that patient data do not appear in this article.

Conflict of Interest

The authors declare that they have no conflict of interest.

APPENDIX 1. GDS Questionnaire

Circle the appropriate answer based on how you have been feeling over the last week:

1)	Are you satisfied with your life?	YES	NO
2)	Have you had to give up many of your activities and obligations?	YES	NO
3)	Do you feel that your life is empty?	YES	NO
4)	Do you often get bored?	YES	NO
5)	Are you often in a good mood?	YES	NO
6)	Are you afraid that something bad is going to happen to you?	YES	NO
7)	Do you feel happy most of the time?	YES	NO
8)	Do you often feel helpless?	YES	NO
9)	Do you prefer to stay at home, rather than going out?	YES	NO
10)	Do you feel you have more problems with memory than other people?	YES	NO
11)	Do you think that it is wonderful to live?	YES	NO
12)	Do you find it difficult to start new projects?	YES	NO
13)	Do you feel full of energy?	YES	NO
14)	Do you feel that your situation is hopeless?	YES	NO
15)	Do you think that most people are better off than you are?	YES	NO

TOTAL SCORE: .....:/15.

APPENDIX 2. STAI-Trait Questionnaire

		Almost never	Sometimes	Often	Almost always
1)	I feel good	0	1	2	3
2)	I get tired quickly	0	1	2	3
3)	I feel like crying	0	1	2	3
4)	I would like to be as happy as others are	0	1	2	3
5)	I miss opportunities because I don't make decisions soon	0	1	2	3
6)	I feel rested	0	1	2	3
7)	I am a quiet, calm and serene person	0	1	2	3
8)	I see that the difficulties pile up and I cannot handle them	0	1	2	3
9)	I worry too much over things that really doesn't matter	0	1	2	3
10)	I am happy	0	1	2	3
11)	I usually take things too seriously	0	1	2	3
12)	I lack self-confidence	0	1	2	3
13)	I feel secure	0	1	2	3
14)	I do not usually confront the crisis or difficulties	0	1	2	3
15)	I feel sad (melancholic)	0	1	2	3
16)	I am satisfied	0	1	2	3
17)	Unimportant thoughts haunt me and disturb me	0	1	2	3
18)	Disappointments affect me so much that I cannot forget them	0	1	2	3
19)	I am stable	0	1	2	3
20)	When I think about current issues and concerns, I get tense and nervous	0	1	2	3

Scales Chart for the STAI-Trait Questionnaire

Centiles	Raw scores Adolescents Man/woman	Raw scores Adults Man/woman	Decatypes
99	46-60 49-60	46-60 49-60	10
97	41/43	39-40/45	9
96	40/42	38/44	9
95	39/41	37/43	9
90	33/36	33/40	8
89	32/35	32/39	8
85	30/33	29/37	8
80	28/31	27/34	7
77	27/30	26/33	7
75	26/29	25/32	7
70	24/27	24/30	7
65	23/26	23/29	6
60	22/25	21/27	6
55	21/23	20/26	6
50	20/22	19/24	6
45	19/21	18/23	5
40	18/20	17/21	5
35	17/19	16/20	5
30	16/18	15/18	4
25	15/17	14/17	4
23	–/–	–/–	4
20	14/16	13/16	4
15	13/15	11/14	3
11	–/14	10/13	3
10	12/13	9/12	3
5	11/12	8/11	2
4	10/11	7/10	2
1	0-6/0-7	0-4/0-7	1

REFERENCES

1. Khan MA. HLA B27 and its subtypes in world populations. Curr Opin Rheumatol. 1995;7(4):263-9.
2. Gran GT, Husby G. The epidemiology of ankylosing spondylitis. Semin Arthritis Rheum. 1993;22(5):319-34.
3. Lassere M, Edmonds J. Psychological measures: Practical issues in observational studies and clinical monitoring. J Rheumatol. 1997;24(5):1004-7.
4. Bishop D, Green A, Cantor S, Torresin W. Depression, anxiety and rheumatoid arthritis activity. Clin Exp Rheumatol. 1987;5(2):147-50.
5. Parker JC, Wright G. Psychologic assessment in rheumatology. Rheum Dis Clin North Am. 1995;21(2):465-80.
6. Kawada T. The prevalence of depression in rheumatoid arthritis: A systematic review and meta-analysis. Rheumatology (Oxford). 2014;53(3):578.
7. Matcham F, Rayner L, Steer S, Hotopf M. The prevalence of depression in rheumatoid arthritis: A systematic review and meta-analysis. Rheumatology (Oxford). 2013;52(12):2136-48.
8. Hawley DJ, Wolfe F. Anxiety and depression in patients with rheumatoid arthritis: A prospective study of 400 patients. J Rheumatol. 1988;15(6):932-41.
9. Peck JR, Smith TW, Ward JR, Milano R. Disability and depression in rheumatoid arthritis. A multi-trait, multimethod investigation. Arthritis Rheum. 1989;32(9):1100-6.
10. Jiang Y, Yang M, Wu H, Song H, Zhan F, Liu S, et al. The relationship between disease activity measured by the BASDAI and psychological status, stressful life events, and sleep quality in ankylosing spondylitis. Clin Rheumatol. 2015;34(3):503-10.
11. Hyphantis T1, Kotsis K, Tsifetaki N, Creed F, Drosos AA, Carvalho AF, et al. The relationship between depressive symptoms, illness perceptions and quality of life in ankylosing spondylitis in comparison to rheumatoid arthritis. Clin Rheumatol. 2013;32(5):635-44.
12. Batmaz ˙I, Sarıyıldız MA, Dilek B, Bez Y, Karakoc¸ M, Çevik R. Sleep quality and associated factors in ankylosing spondylitis: Relationship with disease parameters, psychological status and quality of life. Rheumatol Int. 2013;33(4):1039-45.
13. Martindale J, Smith J, Sutton CJ, Grennan D, Goodacre L, Goodacre JA. Disease and psychological status in ankylosing spondylitis. Rheumatology (Oxford). 2006;45(10):1288-93.
14. Aissaoui N, Rostom S, Hakkou J, Berrada Ghziouel K, Bahiri R, Abouqal R, Hajjaj-Hassouni N. Fatigue in patients with ankylosing spondylitis: Prevalence and relationships with disease-specific variables, psychological status, and sleep disturbance. Rheumatol Int. 2012;32(7):2117-24.
15. Barlow JH, Macey SJ, Struthers GR. Gender, depression and ankylosing spondylitis. Arthritis Care Res. 1993;6(1):45-51.
16. Ward MM. Quality of life in patients with ankylosing spondylitis. Rheum Dis Clin North Am. 1998;24(4):815-27.
17. Van der Linden, Valkenburg HA, Cats A. Evaluation ofdiagnostic criteria for ankylosing spondylitis. A proposal for modification of the New York Criteria. Arthritis Rheum. 1984;27(4):361-8.
18. Garrett S, Jenkinson T, Kennedy LG, Whitelock H, Gaisford P, Calin A. A new approach to defining disease status in ankylosing spondylitis: The Bath Ankylosing Spondylitis Disease Activity Index. J Rheumatol. 1994;21(12):2286-91.
19. Lukas C, Landewe R, Sieper J, Dougados M, Davis J, Braun J, et al. Development of an ASAS-endorsed disease activity score (ASDAS) in patients with ankylosing spondylitis. Ann Rheum Dis. 2009;68:18-24.
20. Calin A, Garrett S, Whitelock H, Kennedy LG, O'Hea J, Mallorie P, Jenkinson T. A new approach to defining functional ability in ankylosing spondylitis: The development of the Bath Ankylosing Spondylitis Functional Index. J Rheumatol. 1994;21(12):2281-5.
21. Murphy EA. A new scoring method for assessment of disease activity in ankylosing spondylitis. In: Abstracts of the XIIth European Congress of Rheumatology. Budapest, 30 junio-6 julio, 1991; p. 268 (Resumen PD2-24).
22. Linares LF, Villalon M, Moreno MJ, Martinez Ferrin J, Gomez J, et al. Validez y fiabilidad de una version adaptada para la espondilitis anquilosante del Health Assessment Questionnaire (HAQ). Rev Esp Reumatol. 1995;22:303-10.
23. González F. Características técnicas y modificaciones introducidas en dos escalas de depresión: estudio piloto para la adaptación y baremación de la GDS y el BDI a la población geriátrica española. Psicogeriatria. 1988;4(5):59-66.
24. Seisdedos Cubero N. Adaptación española del Cuestionario de Ansiedad Estado-Rasgo (STAI). Madrid: Ed. TEA Ediciones, SA; 1988.
25. Brink TL, Yesavage JA, Lum O, Heersema PH, Adey M, Rose TL. Screening tests for geriatric depression. Clin Gerontol. 1982;1(1):37-43.
26. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. Clin Gerontol. 1986;5(1/2):165-73.
27. Rule BG, Harvey HZ, Dobbs AR. Reliability of the Geriatric Depression Scale for younger adults. Clin Gerontol. 1989;9(2):37-43.

28. Katz PP, Yelin EH. The development of depressive symptoms among women with rheumatoid arthritis. The role of function. Arthritis Rheum. 1995;38(1):49-56.
29. Mander M, Simpson JM, Mclellan A, Walker D, Goodacre JA, Carson Dick W. Studies with an enthesis index as a method of clinical assessment in ankylosing spondylitis. Ann Rheum Dis. 1987;46:197-202.
30. Bakker C, van der Linden S, van Santen-Hoeufft M, Bolwijn P, Hidding A. Problem elicitation to assess patient priorities in ankylosing spondylitis and fibromyalgia. J Rheumatol. 1995;22(7):1304-10.
31. Basler HD, Rehfisch HP. Cognitive-behavioral therapy in patients with ankylosing spondylitis in a german self-help organization. J Psychosom Res. 1991;35(2-3):345-54.
32. Hidding A, van Santen M, de Klerk E, Gielen X, Boers M, Geenen R, et al. Comparison between self-report measures and clinical observations of functional disability in ankylosing spondylitis, rheumatoid arthritis and fybromialgia. J Rheumatol. 1994;21(5):818-23.
33. Hidding A, van der Linden S, Boers M, Gielen X, Kester A, Vlaeyen J. Fake good test-taking attitude in ankylosing spondylitis. Arthritis Rheum. 1992;35 supl.:5244.
34. Ward MM. Health-related quality of life in ankylosing spondylitis: A survey of 175 patients. Arthritis Care Res. 1999 Aug;12(4):247-55.
35. Bermudez J. Analisis funcional de la ansiedad. Rev Psicol Gral Apl. 1978;153:617-34.
36. Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry. 1960;23:56-62.
37. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiat. 1961;4:561-71.
38. Zerssen von D. Klinische Selbstbeurteilunggsskalen (KSb-S) aus dem Muenchener Psychiatrischen Informations-System (PSYCHIS Muenchen). In: Die Paranoid-Depressivitaets-Skala. Weinheim: Beltz; 1976.
39. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Appl Psychol Measurement. 1977;1:385-401.