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Symptoms of ankylosing spondylitis and quality of life and work productivity: a systematic review

Abstract

Introduction: Ankylosing spondylitis (AS), a member of the spondyloarthritis group, is a chronic immune-mediated inflammatory arthritis that primarily affects the axial skeleton and sacroiliac joints. The symptoms of AS are generally characterized by chronic pain and back stiffness, which can limit activities of daily living. In its advanced stage, AS can lead to complete ankylosis of the spine, a condition characterized by a severe reduction in mobility. The affected individual then experiences pain and a significant decline in functional ability.

Objective: To clarify how the symptoms of ankylosing spondylitis affect quality of life and work.

Methodology: Integrative literature review of articles published between 2020 and 2024 in the following databases: SciELO, MEDLINE, and LILACS, based on the guiding question: "What are the symptoms of ankylosing spondylitis and how do they affect quality of life and productivity at work?".

Results and discussion: AS significantly impairs quality of life and productivity at work, with low back pain being the most frequent and disabling symptom. Extraskeletal manifestations, neuropathic pain, fatigue, kinesiophobia, deformities, sleep disorders, and depressive and anxiety symptoms have been associated with AS. Presenteeism and absenteeism at work generate economic costs, highlighting the social impact of the disease.

Final considerations: AS profoundly impacts patients' quality of life and productivity at work, mainly due to functional limitations. Addressing the illness requires a holistic approach, public health strategies, and multidisciplinary care.

Keywords: ankylosing spondylitis, symptoms; quality of life, productivity at work, autoimmune diseases

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Introduction

Ankylosing spondylitis (AS), belonging to the group of spondyloarthropathies, is a chronic immune-mediated inflammatory arthritis that primarily affects the axial skeleton and the sacroiliac joints. Several genes are involved in the pathogenesis of AS, with a predominance of the HLA-B27 allele among people with the disease, the majority of whom are white men aged 30 to 40 years.[1] The symptoms of AS are generally characterized by chronic back pain and stiffness, which can limit activities of daily living. The disease also usually affects extra-spinal joint and periarticular structures, causing synovitis, dactylitis, and enthesitis. Additionally, it may be associated with non-articular manifestations, such as psoriasis, uveitis, and inflammatory bowel disease (IBD).[2]

Inflammation and bone erosion, pathological events characteristic of AS, form syndesmophytes, which can be described as bony bridges between the vertebrae. The process of ankylosis consists of this joint remodeling, more specifically of the zygapophyseal joints and the disc spaces of the axial spine. Gradually, this process culminates in the loss of joint space and bone fusion. Thus, complete ankylosis of the spine is established, a condition in which there is an extreme reduction in mobility and episodes of pain.[3]

The prevalence of AS is estimated to be approximately 9 to 30 per 10,000 people, with regional variations.[4] The continents with the highest average prevalences per 10,000 inhabitants, in descending order, are: North America (31.9), Europe (23.8), Asia (16.7), Latin America (10.2), and Africa (7.4). The low prevalence in Latin America and Africa stems from the lower prevalence of HLA-B27 in these regions.[5–9]

It has been observed that the incidence of AS has increased over the past 20 years. Despite this, given the complexity of diagnosis, AS is regularly underdiagnosed or generically classified under the umbrella of spondyloarthropathies. Consequently, the specificity required to correctly identify and treat cases of AS is often overlooked.[10]

The specific diagnosis of AS is based on the presence of at least one clinical and one radiographic criterion listed in the modified New York criteria, which are currently the most widely used. Among the clinical criteria are: 1) low back pain lasting at least three months that improves with exercise and is not relieved by rest; 2) limited mobility of the lumbar spine in the frontal and sagittal planes; and 3) decreased chest expansion. The radiographic criteria are 1) bilateral grade 2, 3, or 4 sacroiliitis; or 2) unilateral grade 3 or 4 sacroiliitis.[11,12]

The characteristics of low back and neck pain present in AS are frequently of inflammatory etiology. To confirm the inflammatory nature of the pain, at least four of the five criteria of the Assessment of SpondyloArthritis International Society (ASAS) must be met. These criteria are: onset before age 40, insidious onset, improvement with exercise, no improvement with rest, and nocturnal pain that improves upon rising.[13–15]

A key benefit of the ASAS criteria is the ability to diagnose AS at an earlier stage, since they do not rely on radiographic changes, which appear later in the course of the disease. In this context, the terms "non-radiographic axial spondyloarthritis" and "radiographic axial

spondyloarthritis" have been coined, the latter being synonymous with ankylosing spondylitis. This has broadened our understanding of the disease, reaffirming the importance of early diagnosis.[16]

Once the diagnosis is established, factors such as disease activity and functional capacity can be measured using the Ankylosing Spondylitis Disease Activity Score (ASDAS) and the Bath Ankylosing Spondylitis Functional Index (BASFI), respectively. It has been noted that these factors are associated with increased absenteeism (absence from work due to illness) and presenteeism (reduced productivity at work due to illness). A higher level of absenteeism was also observed among manual workers and those with greater disease activity.[17–19]

The treatment of AS primarily involves the use of nonsteroidal anti-inflammatory drugs (NSAIDs), such as selective and nonselective cyclooxygenase inhibitors, and physical therapy. If first-line treatment fails, therapeutic options include the use of tumor necrosis factor (TNF) inhibitors, interleukin-17 (IL-17) inhibitors, and Janus kinase (JAK) inhibitors. It is important to emphasize the importance of initiating treatment in the early stages of the disease to prevent disabling and irreversible structural damage.[20,21]

Despite the global prevalence of AS and its disabling potential, the disease is insufficiently discussed by the scientific community. The clinical picture of AS needs to be better understood, as it impairs quality of life and impacts public health. Furthermore, treatment with Tumor Necrosis Factor (TNF) blockers and the mandatory leave of those affected generate expenses for the Unified Health System (SUS). In this regard, it is essential that AS be better discussed and clarified and that there be greater awareness of its consequences for affected individuals and society.[22,23]

Thus, we sought to conduct a study on how AS manifests clinically, relating symptoms to declines in quality of life and work, based on the literature from 2020 to 2024. Therefore, this study aimed to investigate how the symptoms of ankylosing spondylitis affect quality of life and work.

Methodology

An integrative literature review was conducted, involving data collection from the main studies describing the symptoms and impacts of AS. The study was conducted through the following steps: 1) selection of the topic and research question; 2) selection of databases and search terms; 3) definition of inclusion and exclusion criteria; 4) search of the selected databases; 5) analysis of the identified articles; and 6) discussion of the results (CAPP, 2021).

This type of literature review was chosen because it is a detailed research strategy that provides a synthesis of scientific knowledge.[24] The search for articles published between 2020 and 2024 in Portuguese, English, or Spanish, and made available in full and free of charge online in the Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American and Caribbean Health Sciences Literature (LILACS), and Scientific Electronic Library Online (SciELO) databases, was conducted by two independent researchers.

The studies listed should address the question: "What are the symptoms of ankylosing spondylitis, and how do they affect quality of life and work productivity?" To this end, the following combinations of Health Sciences Descriptors (DeCS and MeSH) were used in the search: "(Espondilite Anquilosante) AND (Qualidade de Vida),' '(Espondilite Anquilosante) AND (Trabalho),' '(Ankylosing Spondylitis) AND (Quality of Life),' '(Ankylosing Spondylitis) AND (Work).". Literature reviews, monographs, theses, dissertations, and duplicate, paid, or off-topic articles were excluded.[25–36] To better illustrate the selection process, the PRISMA flowchart (Figure 1) is presented, detailing the step-by-step process of including or excluding the searched publications, as suggested by Page et al.[37]

Subsequently, the retrieved studies underwent a critical review, selecting those that aligned with the guiding question and objectives of this study. Finally, the data collected from the selected publications were summarized in a table created in Microsoft Word, which includes authorship, year of publication, study design, and findings. The database search did not include confidential patient information; therefore, approval of the study protocol by a research ethics committee was not required, in accordance with Resolution No. 466 of the National Health Council, dated December 12, 2012.

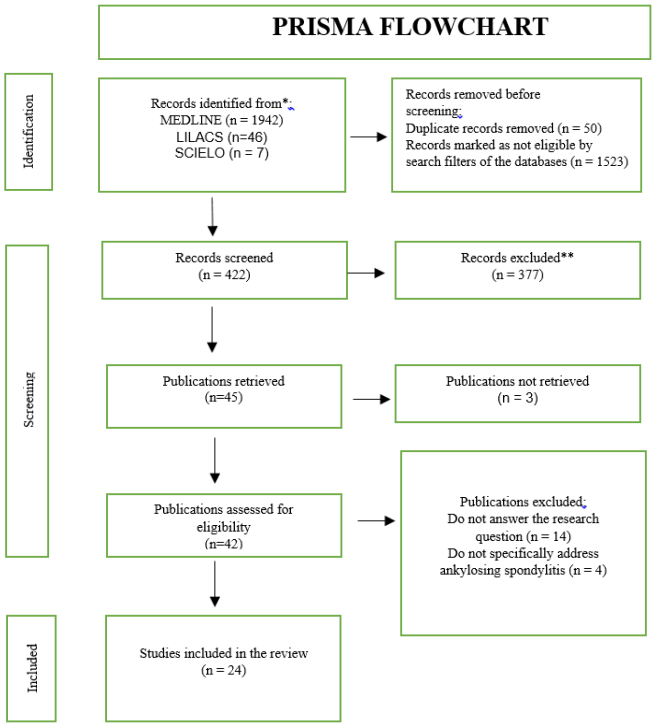

Figure 1 PRISMA flowchart illustrating the article selection process, including identification, screening, and inclusion of articles.

*If feasible, consider reporting the number of records identified from each database or registry searched (rather than the total number across all databases/registries).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

Source: Authorship adapted from Page MJ, et al. BMJ 2021;372:n71. doi: 10.1136/bmj.n71, 2020).

Results

The results were derived from 24 articles selected from the databases. Table 1 includes essential data for understanding the topic.

Table 1 Description of the studies included in the systematic review.

Authorship and year of publication	Study design	Results
Atik et al.[38] 2024	Cross-sectional study with 40 participants, using laboratory data, questionnaires, and electrophysiological testing.	23 patients had neuropathic pain. These patients had longer symptom duration and higher disease activity than patients with RA without neuropathic pain.
Cortes-Rodriguez et al.[39] 2024	Descriptive observational case-control study that recruited 56 participants with AS and 56 healthy individuals.	The AS group was more frequently affected by foot pain and loss of function. This population has a lower quality of life regarding foot health and general well-being.
Magrey et al.[40] 2024	Analysis using pooled data from two RCTs of tofacitinib in patients with AS. Data from 330 to 475 patients were available.	Participants who experienced more severe back pain and nocturnal spinal pain had high rates of activity impairment, presenteeism, and loss of productivity.
Safiah et al.[41] 2024	A cross-sectional study that interviewed 103 patients with AS.	Nearly half (49%) had depressive symptoms, and 37% had anxiety symptoms. 39% frequently experienced sleep disturbances. 61% reported severe fatigue. One of the identified predictors was job loss due to the disease.
Karatekin et al.[42] 2023	Descriptive study that followed 75 patients for 15 years.	Patients with AD exhibited anxiety and depressive symptoms. There was a decrease in depression and anxiety scores over 15 years, and this improved quality of life.
Kedyk Stanislavchuk,[43] 2023	Observational cross-sectional study examining 94 patients with AD without DN and 48 patients with AD and DN.	Patients with AD had a prevalence of Dementia of 33%. They had greater physical dysfunction, functional impairment, AD activity, and worse health indices compared to those without Dementia.
Kiltz et al.[44] 2023	A multicenter, observational, cross- sectional study conducted in Germany. The sample consisted of 770 patients with AAS who completed questionnaires. Among them, 75% had a diagnosis of AS.	The most common symptom was back pain (87%). Of 695 patients, 15% reported an inability to work due exclusively to AS. 62% reported absenteeism within one year.
Lan et al.[45] 2023	A cross-sectional study that obtained a sample of 75 patients with AS.	Frequency of symptoms: in the lumbar spine 96%; in the cervical spine 40%; in the hip joint 36%; in the knee joint 25%. Symptoms contributed to a poor physical health score, indicating limited physical activity and poorer overall health. Higher pain scores were associated with poorer physical and mental health.
Sari et al.[46] 2023	Prospective cross-sectional study with a sample of 60 patients with OA.	High kinesiophobia was present in 48% of patients, and low kinesiophobia in 51%. Patients with high kinesiophobia had greater impairment in functional ability, quality of life, and spinal mobility.
Güzel et al.[47] 2022	A prospective cross-sectional study that included 100 patients with AS. Foot X-rays and electrophysiological tests were used.	Participants presented with pain in the feet, hips, and lower back, as well as enthesopathy. These symptoms were associated with pes cavus, considered a type of deformity. The prevalence of foot deformities was 75%.
Karoli et al.[48] 2022	A cross-sectional study that evaluated 200 Patients with AS and sacroiliitis at diagnosis.	Patients presented with inflammatory back pain, enthesitis, anterior uveitis, ulcerative colitis, and psoriasis. Most patients had advanced-stage AS, with high disease activity scores and elevated inflammatory markers.
Lee et al.[49] 2022	Hybrid observational study. Sample of 497 patients with AS who had been using TNF-inhibitors for at least 3 months.	Over the course of one month, there was an average of 54 hours of lost productive time. Participants self-rated their work performance as 7.5 points on a scale of 0 to 10.
Maatallah et al.[50] 2022	Cross-sectional study with 50 patients with AS. It included 40 patients with common low back pain for more than 3 months as a control group.	Participants with AS had sleep disturbances, which were positively correlated with the level of AS activity.

Table 1 Continued....

Van der Meer et al.[51] 2022	This study evaluated 414 patients with axial spondyloarthritis (362 were followed for 4 years), of whom 87% had AS. Data were obtained from the prospective, longitudinal GLAS (Groningen Leeuwarden Axial Spondyloarthritis) cohort study.	31.4% had a positive history of at least one extra-articular manifestation: 24.9% UAA, 9.4% IBD, and 4.3% psoriasis. After 4 years, 15.7% developed extra-articular manifestations: 13.3% developed UAA (of whom 9.7% had recurrent UAA), 1.9% IBD, and 0.8% psoriasis.
Ahmed et al.[52] 2021	A cross-sectional study that included a sample of 30 patients with AS and 30 healthy individuals.	Patients with AS experienced difficulties with swallowing and speech. Consequently, they were more likely to aspirate food and have communication impairments.
Borman KaygisizYaman,[53] 2021	An observational cross-sectional study that included 58 patients with AS.	About 50% of the patients had neuropathic pain. They reported lower scores on measures of functionality and quality of life. The frequency of neuropathic pain was not influenced by disease activity level.
Hunter et al.[54] 2021	Analysis of secondary data from the AIdephi AxSpA Disease Specific Programme. The sample consisted of 515 participants with AS and 495 with non-radiographic AS.	Patients with AS were more likely to have mobility problems and spinal osteoporosis. Rates of absenteeism, presentism, work productivity, and activity impairment were similar among them.
Korotaeva et al.[55] 2021	Analysis of secondary data from the AIdephi AxSpA Disease Specific Programme (DSP) survey. The sample consisted of 487 patients from the U.S. and 922 patients from CEE (Central and Eastern Europe). Outcomes were reported by 55% of U.S. patients and 86% of CEE patients.	50% had back pain; 20.7% had back pain for more than 3 months; 34.9% had morning stiffness lasting more than 30 minutes. The loss of work productivity was 33% in CEE and 23% in the US. Activity impairment was 41% in CEE and 30% in the US.
Mogard et al.[56] 2021	Analysis of secondary data from the SPARTAKUS cross-sectional study. The sample included patients classified with AS (n=120) or non-radiographic AS (n=55).	Patients with AS had a prevalence of fibromyalgia of up to 15%. In addition, 45% of patients with AS had chronic widespread pain. They experienced increased pain sensitivity, a finding associated with higher disease activity.
Souza et al.[57] 2021	A cross-sectional study involving 30 patients with AS.	Only one patient did not have a diagnosis of TMD. 73% reported high levels of chronic pain associated with moderate or severe depression. The most prevalent symptoms were related to bruxism during sleep and while awake.
Yüce et al.[58] 2021	A cross-sectional study evaluating 100 patients with OA and 100 healthy individuals.	The sleep of 57% of patients with OA was classified as poor quality. Lower scores for quality of life, physical function, and pain were significantly higher in patients with poor sleep quality. This was positively correlated with depressive symptoms.
Atar Askin[59] 2020	Anobservational cross-sectional study that included 80 patients with AS.	Patients with AS and DN showed greater pain intensity, higher levels of AS activity, reduced mobility, depressive symptoms, and poorer quality of life.
Vinueza Acurio[60] 2020	An analytical cross-sectional study with a sample of 120 patients diagnosed with AS and on biologic therapy. Data collection was performed using questionnaires.	Approximately 42% of patients had two extra-articular manifestations, the most prevalent of which were knee synovitis and uveitis. Overweight patients were twice as likely to have functional impairments.
Zhou et al.[61] 2020	A cross-sectional study involving 150 patients with AS.	Patients with AS experienced fatigue. This symptom was associated with more severe pain, anxiety symptoms, more severe functional impairment, sexual dysfunction, and poorer sleep quality. The combination of AS and fatigue significantly reduced quality of life.

Discussion

The body of evidence from this systematic review consistently reveals that the symptoms of ankylosing spondylitis are related to various dimensions of patient health and have a direct impact on quality of life and work productivity. Among the 24 studies identified, seventeen address the physical symptoms of AS and their practical implications, three focus primarily on the consequences of the disease on work productivity, two investigate the relationship between AS and mental health, and two highlight the influence of AS on sleep.

According to Lan et al.[45] and Kiltz et al.,[44] back pain is the most common symptom of osteoarthritis and is strongly associated with functional disability. Whether acute or chronic, low back pain restricts mobility, which results in limitations in patients' activities of daily living. Furthermore, low back pain is also the manifestation most commonly cited by patients as the cause of high rates of presenteeism and loss of productivity at work. Consequently, low back pain significantly contributes to a poorer quality of life and reduced work performance (Magrey *et al.,* 2024).[40]

Not limited to the lumbar region, pain caused by OA can frequently affect the neck, shoulders, hips, and knees, as found in Safiah et al.[41] and Lan et al.[45]. In line with our findings regarding pain, Li, Ma, and Yang[62] state that the chronic pain typical of AS imposes restrictions on daily life and work. In this study, patients report that during episodes of pain they are unable to perform simple tasks, such as using the bathroom without assistance or walking without difficulty. There are reports that some people have even lost their jobs due to the physical limitations caused by the disease.

This review found a similar situation in the study by Kiltz et al.,[44] in which some participants reported an inability to work due exclusively to the disease. From a no less dramatic perspective, Kiltz et al.[44] and Hunter et al.[54] note that there are patients who manage to keep their jobs but exhibit some level of presenteeism and absenteeism, a fact that also indicates a decline in work performance. Specifically, according to Lee et al.,[49] over a four-week period, patients with AS lose an average of 54 hours of productive time due to presenteeism (47 hours) and absenteeism (6 hours).[63–65] Lopex, Martind, Rou

This loss results in an estimated cost of $12,578 per year. The systematic review by Rudwaleit et al.[66] also reported similar findings: patients with axial spondyloarthritis experienced approximately 20 to 22 hours per week of overall work impairment due to absenteeism or presenteeism, with the latter being the primary cause of reduced work productivity. This shows that the adverse effects of AA symptoms can impact both the individual and collective spheres—the latter illustrated by workplace relationships and the healthcare system.

Still regarding pain, it was noted that it may contain a neuropathic component that is significantly prevalent in patients with AA, as shown in four studies found in this research. Atar & Askin,[59] Atik *et al.,*[38] and Kedyk & Stanislavchuk[43] observed that individuals with OA and neuropathic pain (NP) are associated with greater pain intensity, higher levels of OA activity, reduced mobility, lower functional capacity, and depression. However, Borman, Kaygisiz, and Yaman,[53] while agreeing with the relationship between NP and poorer functionality and quality of life, disagree with the other studies in finding that the occurrence of NP was not influenced by the level of AS activity. A meta-analysis by Kim, Son, Lee et al.[67] confirms most of the findings of this review, as it concludes that greater pain severity, higher disease activity, and lower quality of life are significantly present in patients with RA and NP. Thus, it can be argued that NP is an aggravating factor in the decline of quality of life.

Fatigue is also an important factor in the deterioration of patients' quality of life. The study by Zhou et al.[61] specifically aimed to assess the effects of fatigue on health-related quality of life in 150 patients with AS. A trend was observed toward more intense pain, higher levels of anxiety, and poorer sleep quality in those with AS and associated fatigue, impairing quality of life. The cohort study by Bedaiwi *et al.*,[68] which included 615 individuals with AS, yielded similar results: patients with severe fatigue tended to show higher disease activity and lower scores on indices assessing functionality and quality of life. It also states that fatigue is a common manifestation that affects well-being and is potentially disabling.

In addition to the symptoms discussed above, there is a range of conditions that occur outside the axial skeleton and may be related to AS. Van der Meer et al.[51] investigated the prevalence of extraskeletal manifestations in approximately 360 patients with AS. The most frequently observed conditions were acute anterior uveitis (AAU), inflammatory bowel disease (IBD), and psoriasis. The development of these conditions was associated with a tendency toward reduced quality of life. Similarly, Safiah et al.[41] identified uveitis and cutaneous manifestations associated with AS. Furthermore, in a sample of 200 individuals with AS and radiographic sacroiliitis at diagnosis, Karoli et al.[48] noted that AUA, enthesitis, ulcerative colitis, and psoriasis were common. On the other hand, Vinueza & Acurio[60] identified knee synovitis as the most prevalent extra-articular manifestation, followed by uveitis. Comparatively, Maghraoui's[69] literature review found some similarities: uveitis and IBD were quite common. However, it was noted that patients with AS also suffered from cardiovascular, renal, and pulmonary involvement, which was not found in the results of this study. Furthermore, this study did not report dactylitis, a symptom usually seen in AS, as described by Benavent et al.[70] and Llop et al.[71] Despite certain discrepancies in the frequency of manifestations, it is evident that they cause functional limitations in patients' daily lives, impacting their quality of life.

Regarding deformities caused by AS, the study by Güzel et al.,[47] which evaluated X-rays of the feet of 110 patients, demonstrated a high prevalence of deformities (75% of participants). These were significantly associated with enthesopathy and pain in the feet, hips, and lower back. In contrast, the case-control study by Cortes-Rodriguez et al.[39] showed that, even without deformities, patients with AS had more foot pain and reduced functionality compared to healthy individuals.72–75

Similarly, Koca et al.[76] also state that the course of AS frequently affects the foot and ankle, including enthesitis, tarsitis, and deformities. This impacts walking performance. There are also reports, according to Lopez-Bote et al., of erosive lesions on the heel and sclerotic and proliferative lesions present in AS. Based on this, it is noted that the foot health of people with AS is impaired, and this directly affects functionality, disease activity, and quality of life.

In patients with AS, temporomandibular disorder (TMD) is a common condition. As Souza *et al.*[57] found, there is a significant prevalence of TMD in AS. Symptoms such as bruxism, whether during sleep or while awake, were commonly observed. Furthermore, an association was noted between high levels of chronic pain and depression. However, it is worth noting that this study analyzed only 30 patients with AS, a fact that may imply a bias, as the sample is small. Nevertheless, a literature review proposed by Holanda et al.[77] confirms the possible association between TMD and AS, based on the presence of symptoms reported by patients and signs detected by researchers. Furthermore, pain and tenderness on palpation of the temporomandibular joint (TMJ) were identified in the review, as well

as restricted TMJ mobility due to the inflammatory response typical of RA. This immune process is also responsible for erosions in the TMJ. Neither study explicitly addresses the consequences on quality of life, but it is possible to conclude that TMD undermines physical function, mental health, and sleep quality.

Regarding mental health, there is a significant prevalence of anxiety and depressive symptoms in OA, often correlated with pain. Safiah et al.[41] report that, of 103 patients with OA, nearly half of the study sample presented clinically significant depressive symptoms, including thoughts of self-harm. Anxiety symptoms, meanwhile, were present in approximately 37% of participants. The contextual factors associated with these symptoms were job loss due to AA, hip pain, and a history of mental distress. Reddy et al.[78] corroborate these findings, as they found anxiety and depressive symptoms with similar frequency in patients with axial spondyloarthritis. In addition, reports indicated that some of these symptoms stemmed from, for example, beliefs that the medications used to treat the disease had side effects and that this was being concealed by doctors. Mental health impairments were associated with high disease activity and reduced work productivity.

Closely related to depression, sleep health is not spared by ankylosing spondylitis. Participants in the study by Safiah et al.[41] showed a high prevalence of sleep disorders. Similarly, Yüce et al.[58] reported a positive correlation between poor sleep quality (present in 57% of their sample of patients with AS) and depressive symptoms. Similarly, Frede et al.[79] indicate that insomnia is common in patients with spondyloarthritis, even those undergoing treatment, and significantly reduces quality of life, especially when it causes daytime dysfunction.[80–85]

Final considerations

Ankylosing spondylitis profoundly impacts patients' quality of life and work productivity, primarily due to chronic low back pain and, consequently, functional limitations. Mental health is also compromised, as AS has been associated with anxiety, depression, and sleep disorders. Given this scenario, the issue requires not only medical interventions but also public health strategies that promote professional training on the topic, a multidisciplinary approach, and policies for inclusion in the labor market. These needs are particularly relevant in the Brazilian context, where access to diagnosis and specialized treatment is not always guaranteed. Therefore, this study aims to contribute to a more holistic view of the disease, emphasizing both its physical manifestations and its emotional and social repercussions. Finally, it is important to recognize that this review has some limitations, as most of the included studies assessed the symptoms and manifestations of AD based on subjective reports and self-reported questionnaires completed by patients. Furthermore, small sample sizes and heterogeneity in patients' health conditions (such as medical history, comorbidities, and current treatments) may limit the interpretation of the results.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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