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Relationship of Work Productivity and Social Activities with Disease Activity in Ankylosing Spondylitis Patients

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What is known on this subject?

Ankylosing spondylitis (AS) is a chronic, inflammatory rheumatic disease that affects the axial spine and sacroiliac joints, with associated peripheral joint involvement and extra-articular clinical findings. It is important to acknowledge the impact of this disease on patients' lives and to provide appropriate support and treatment to improve their quality of life. Research has shown that patients with AS experience significantly decreased work productivity and social activities. Investigating the causes of decreased work productivity and social activity will help direct patients towards appropriate treatment, reduce economic burden, and maintain participation in social roles. It is important to acknowledge that there may be multiple factors contributing to these issues, and a thorough investigation can help identify the most effective solutions.

What this study adds?

This prospective cross-sectional clinical trial is the first study to evaluate work productivity in Turkish patients with Ankylosing Spondylitis.

ABSTRACT

Objective: Ankylosing spondylitis (AS) is a chronic, inflammatory disease that starts in the most productive years of life and causes severe disability in at least 1/3 of patients. In our study, we aimed to investigate the relationship between work productivity, social activities and disease activity in AS patients.

Material and Methods: A total of 100 AS patients aged 18-65 years and 100 healthy volunteers were included. Work Productivity and Activity Impairment Questionnaire: general health (WPAI:GH); social role participation questionnaire (SRPQ) short form values were recorded. Bath AS functional index (BASFI), Bath AS disease activity index (BASDAI), and Bath AS metrology index (BASMI) values were recorded.
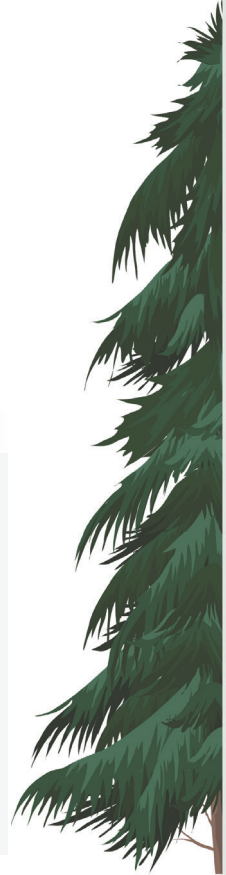
Results: Among AS patients, the rate of quitting work due to health problems was 16% and the rate of job change due to illness was 34%. The unemployment rate was 25% in the AS group and 3% in the control group. SRPQ subscales were lower in the AS group compared to the control group. In the AS group, there was a statistically significant relationship between WPAI and SRPQ values; BASDAI and BASFI scales; and

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between SRPQ values and BASMI.

Conclusion: Reduced work productivity and social activities were significantly more prevalent in the AS patient group. Investigating patients' decreased work productivity and decreased social activities will help direct patients to appropriate work, reduce the economic burden, and maintain participation in social roles.

Keywords: Spondylitis, ankylosing, quality of life, employment

Introduction

Ankylosing spondylitis (AS) is a systemic, chronic, inflammatory rheumatic disease affecting the axial spine and sacroiliac joints, with associated peripheral joint involvement and extra-articular clinical findings. Onset usually occurs during the most productive years of life and causes severe disability in at least 1/3 of patients (1). Compared to the general population, patients with AS are more likely to be unemployed (2,3). Although there are some differences in work-related difficulties, disease-related absenteeism and tardiness are the most prominent problems (4). It has been reported that AS may lead to a change of job, reduction in working hours, or limitation of career progression in some patients (5).

Participation in social roles is essential in establishing and maintaining personal and economic autonomy for individuals at all stages of life and can contribute to long-term physical and mental health (6,7). Social role participation is a crucial aspect of an individual's life. It encompasses various domains such as parenting, social and community interactions, being a student or employee, and leisure time pursuits. It has been widely acknowledged as a significant outcome in observational studies and intervention programmes aimed at enhancing the overall functioning and health of patients with chronic diseases (8). This is especially important for conditions that can severely restrict physical functionality, such as inflammatory rheumatic diseases (7).

This study validates the Work Productivity and Activity Impairment Questionnaire: general health (WPAI:GH) in Turkish for the first time and evaluates the relationship between social activities in AS patients and a control group.

Material and Methods

Our cross-sectional clinical research included 200 volunteers, consisting of patients with AS and healthy volunteers, who met the criteria.

Inclusion Criteria

- Patients aged 18-65 years with AS

- Healthy volunteers between the ages of 18-65 with no known musculoskeletal disease

Exclusion Criteria

- Those with serious systemic diseases that may prevent them from working (respiratory system, cardiovascular system, renal and metabolic diseases)

- Those with orthopaedic and psychiatric diseases

- Known inflammatory diseases other than AS

- Pregnant women

- Those who develop disability due to trauma history

- Post-operative disability

- Patients with neurological sequelae

Our study involved a group of 100 healthy volunteers without inflammatory musculoskeletal diseases who were matched in age and gender to the group of 100 AS patients (aged 18 to 65 years) who visited our outpatient clinic between 15 April 2019 and 15 April 2020 and fully met the 1984 Modified New York Criteria and ASAS 2010 criteria. Participants completed interview-based questionnaires on work productivity, social role participation, and AS disease activity, providing valuable insights into the impact of the disease on their daily lives. The study adhered to the Declaration of Helsinki. The study protocol was approved by the Clinical Research Ethics Committee of University of Health Sciences Turkey, Bakırköy Dr. Sadi Konuk Training and Research Hospital on 08.04.2019 (protocol no: 2019/168, decision no: 2019-07-16).

Evaluation and Used Scales

The WPAI:GH was specifically used to assess work-related difficulties, while the social role participation questionnaire (SRPQ) short form, was used to evaluate integration into society and social activities (9). The validity and reliability study of the Turkish version was conducted by Bucak et al. (10) and showed that the Turkish version is valid and reliable in patients with AS. Moreover, the Bath AS disease activity index (BASDAI) was used to assess disease activity, the Bath AS functional index (BASFI) to evaluate functional status, and the

Bath AS metrology Index (BASMI) to assess spinal mobility in the AS patient group.

Statistical Analysis

For this study, a sample size of 68 was calculated with a power of 0.99 and $p<0.05$ (11). To test the data conformity to a normal distribution, the Kolmogorov-Smirnov test with Lilliefors correction was used. Median (interquartile range) was chosen to represent central tendency, and frequency (percentage) was used for categorical variables. The means of the two groups were compared using the Mann-Whitney U test. The comparison between groups in terms of categorical variables was analyzed using Pearson's chi-square or chi-square with Yates' correction (continuity correction), with a significance level of 0.05. Correlation analyses were conducted using Spearman's test. The study defined a valid relationship as having a correlation coefficient (rho) greater than 0.30 and a p value less than 0.05.

Results

Table 1 presents the demographic and study data of the patients. The study included 100 AS patients (33 females, 67 males) and 100 healthy controls (45 females, 55 males). It is worth noting that in the AS group, 25 patients (25%) were not employed, compared to only 3% in the healthy control group. The study reveals that AS patients had significantly higher rates of quitting and changing jobs due to illness compared to healthy subjects (16% vs. 0% and 34% vs. 0%, respectively).

Table 2 demonstrates a comparison of work productivity and social role performance subscales. AS patients were found to be more affected by loss of work capacity, disease-related activity impairment, and physical difficulty ($p<0.05$).

Table 3 presents the variables that have a significant impact on both work productivity and social role performance subscales. After a thorough analysis of the variables affecting work productivity and social role performance subscales in the AS patient group, it was found that patient age, length of employment, and an increase in working days led to an increase in labor loss, loss of work efficiency, and general work damage. On the other hand, there was a negative correlation between the duration of biological agent use and loss of work efficiency and general work damage. It was observed that patients with more years of biological use were less affected ($p<0.05$). The erythrocyte sedimentation rate (ESR) value had a statistically significant effect on physical difficulty and performance satisfaction, which are components of the disease activity disorder and social role performance subscales ($p<0.05$).

Discussion

The study found that AS patients experienced significantly higher incapacity for work (measured in hours) due to health problems, loss of productivity during working hours, rate of job change due to illness, and difficulty maintaining the duration of daily activities compared to the control group. The study confidently found that decreased work productivity was significantly correlated with BASDAI and BASFI, while difficulty in time allocated to activities was significantly correlated with BASFI, BASDAI, and BASMI. According to a case-control study conducted by Ulus et al. (12) with 61 AS patients and 40 healthy controls, 14.8% of AS patients left their previous job due to their condition. Our study found that among AS patients, 16% quit their jobs due to health problems and 34% changed jobs due to the disease. These findings demonstrate the significant impact of AS on work productivity. Additionally, 25% of the AS group was not working compared to only 3% in the control group. According to a study conducted by Macfarlane et al. (13), which covered 83 centres in the UK and evaluated 1188 AS patients attending the Rheumatology outpatient clinic, there was an average of 30% loss of work productivity, 30% overall work impairment, and 30% disease activity impairment. The study also found that the decrease in work productivity was associated with an increase in BASDAI, BASFI, and BASMI values (13). Goh et al. (14) in a study conducted in Singapore with 156 AS patients, 27.6% were unemployed, loss of work capacity was 4.5%, loss of work efficiency was 24.9%, general work impairment was 27.6%, and disease activity disorder was 28.2% on average. Loss of work capacity was found to be associated with disease duration. Additionally, loss of work capacity, general work disability, and disease activity disorder were associated with BASDAI ≥4 and BASFI (14). In our study, according to the WPAI questionnaire, work loss, work productivity loss, general work disability, and disease activity disorder were higher in the AS group than in the control group. In the AS group, the average rates were 30% for work loss, 30% for work disability, and 40% for disease activity disorder. In the control group, these rates were 10%. According to the results of studies on work productivity in patients with AS, high disease activity, reduced physical function, and loss of work productivity are common. High BASDAI and BASFI were correlated with loss of work, loss of work productivity, general work disability, and increased disease activity. Patient age was correlated with work loss, work productivity loss, and general work disability. Participation in social roles is often crucial for individuals to maintain economic and personal independence, as well as increase self-confidence, and may contribute to later physical and mental health. Oude Voshaar

et al. (15) 246 AS patients and 245 healthy controls, the SRPQ subscales of experienced physical difficulty were higher and role performance satisfaction scores were lower in the AS group compared with the control group. In the AS in-group evaluation, experienced physical difficulty was found to be lower in those with BASDAI <4. Role performance satisfaction

Table 1. Demographic and working characteristics

	AS group (n=100)	Control group (n=100)	p value
Patient age (year)	44.0 (37.0-50.0)	41.5 (32.0-50.8)	0.074
Gender			
Woman	33 (33.0%)	45 (45.0%)	0.082
Man	67 (67.0%)	55 (55.0%)	
BMI, kg/m²	26.81±2.57	25.83±1.85	0.09
Civil status			
Married	57 (57.0%)	48 (48.0%)	0.094
Single	43 (43.0%)	52 (52.0%)	
Education (year)	12.0 (5.0-12.0)	16.0 (12.0-16.0)	<0.001*
Job			
Officer	7 (7.0%)	13 (13.0%)	0.038*
Employee	39 (39.0%)	32 (32.0%)	
Self employment	33 (33.0%)	15 (15.0%)	
Student	2 (2.0%)	1 (0.0%)	
Housewife	7 (7.0%)	4(0.0%)	
Retired	12 (12.0%)	3 (3.0%)	
Living environment			
Alone	10 (10.0%)	13 (13.0%)	0.078
Family/friend	90 (14.0%)	87 (87.0%)	
Work status			
Non working person	25 (25.0%)	3 (3.0%)	0.048*
Desk job	11 (11.0%)	22 (20.0%)	
Physical labor	62 (62.0%)	67 (67.0%)	
Health employee	2 (2.0%)	8 (8.0%)	
Weekly working days	5.0 (5.0-6.0)	5.0 (5.0-5.0)	0.002*
Quit work			
Yes	16 (%16.0)	0 (0.0%)	<0.001*
No	84 (%84.0)	100 (100.0%)	
Daily working hours			
0	12 (%12.0)	0 (0.0%)	<0.001*
0-4	0 (%0.0)	1 (1.0%)	
4-8	35 (%35.0)	57 (57.0%)	
8-12	49 (%49.0)	41 (41.0%)	
>12	4 (%4.0)	1 (1.0%)	
Job change due to illness			
Yes	34 (%34.0)	0 (0.0%)	<0.001*
No	66 (%66.0)	100 (100.0%)	

*p<0.05, AS: Ankylosing spondylitis, BMI: Body mass index, SD: Standard deviation

scores were found to be higher in those with BASDAI <4 than in those with BASDAI >4 (15). In our study, the AS group showed higher scores on the SRPQ physical difficulties subscales, and lower role performance satisfaction scores compared to the control group. Higher SRPQ/experienced physical difficulties scores and lower SRPQ/role performance satisfaction scores were found to be positively and strongly associated with ESR, BASDAI, BASFI, and BASMI. Furthermore, our results were consistent with other studies. In our study, we did not find a correlation between disease duration and work productivity, and social participation. We believe that the duration of the disease and the time of diagnosis should be taken into account in future studies of work productivity, and that early diagnosis and treatment may have positive effects. One of the issues that has been addressed in studies to assess the decline in work productivity in people with AS, is the medications that patients are taking. Studies have shown that the use of biological agents generally improves function, reduces disease activity, improves quality of life, and consequently increases work productivity (16,17,18). Deodhar

Table 2. Comparison of WPAI and SRPQ subscales results

	AS group (n=100)	Control group (n=100)	p value
WPAI worktime miss	0 (0-6.3)	0 (0-0)	<0.001*
WPAI work productivity loss	30 (0-60)	10 (10-10)	0.001*
WPAI overall loss of work productivity	30 (0-60.9)	10 (10-10)	0.001*
WPAI impairment in activities of daily living	40 (20-60)	10 (10-20)	<0.001
SRPQ physical challenge	2 (1.6-2.7)	1.3 (1-1.8)	<0.001*
SRPQ performance satisfaction	3 (2.4-3.7)	3.3 (3-3.8)	0.002*

*p<0.05, WPAI: Work Productivity and Activity Impairment Questionnaire, SRPQ: Social role participation questionnaire, AS: Ankylosing spondylitis

Table 3. Variables affecting WPAI and SRPQ subscales

		WPAI WL	WPAI WPL	WPAI GWD	WPAI DAD	SRPQ PC	SRPQ PS
Patient age	rho	-0.261	-0.323	-0.341			
	p	0.009	0.001	0.001			
Working year	rho	0.423	0.497	0.510			
	p	0.000	0.000	0.000			
Working day	rho	0.428	0.591	0.595			
	p	0.000	0.000	0.000			
Biological agent	rho	-0.196	-0.345	-0.344			
	p	0.050	0.000	0.000			
CRP	rho	0.130	-0.002	0.026	0.120	0.105	-0.163
	p	0.196	0.986	0.799	0.233	0.297	0.106
ESR	rho	0.015	0.057	0.048	0.290	0.301	-0.266
	p	0.883	0.571	0.639	0.003	0.002	0.008
BASDAI	rho	0.315	0.337	0.348	0.548	0.504	-0.390
	p	0.001	0.001	0.000	0.000	0.000	0.000
BASFI	rho	0.301	0.319	0.314	0.510	0.514	-0.421
	p	0.002	0.001	0.001	0.000	0.000	0.000
BASMI	rho	0.005	-0.067	-0.060	0.320	0.278	-0.300
	p	0.962	0.510	0.555	0.001	0.005	0.002

Spearman correlation test. WL: Work loss, WPL: Work productivity loss, GWD: General work damage, DAD: Disease activity disorder, PC: Physical challenge, PS: Performance satisfaction, CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, BASDAI: Bath ankylosing spondylitis disease activity index, BASFI: Bath ankylosing spondylitis functional index, BASMI: Bath ankylosing spondylitis metrology index, WPAI: Work Productivity and Activity Impairment Questionnaire, SRPQ: Social role participation questionnaire

et al. (19) in a study involving 371 patients with AS, one group received 150 mg intravenous (IV) secukinumab, another group received 75 mg IV secukinumab, and the other group received placebo. The WPAI:GH questionnaire was used to assess patients' work productivity at baseline and after 16 and 52 weeks of secukinumab treatment. At the end of 52 weeks, an improvement of 2.1% in work loss, 20.1% in work productivity loss, 20.8% in general work impairment, and 18.7% in disease activity impairment was observed in the group receiving 150 mg IV secukinumab, while an improvement of 2.8% in work loss, 20.5% in work productivity loss, 20.1% in general work impairment, and 24.8% in disease activity impairment was observed in the group receiving 75 mg IV secukinumab (19). In our study, with increasing duration of use of biologics in patients with AS, there was a negative correlation between loss of work performance and general work impairment, and patients with more years of use of biologics were less affected.

Study Limitations

Our study has some limitations. We believe that a follow-up study with a larger and more detailed group would be useful, since our cross-sectional evaluation of work productivity with one group of subjects prevents us from obtaining more comprehensive results.

Conclusion

The aim of our study was to measure the impact of AS on the productivity of patients in both work and social activities, as well as to assess its relationship with other disease parameters. The study found that the AS patient group had a significantly greater decrease in work productivity and social activities. Our findings indicate that AS has a significant impact on the working status of patients, disease-related factors are associated with work productivity. These factors include not only physical findings such as disease activity and functional capacity, but also, those affecting patients' social lives. Early diagnosis and treatment of AS patients can increase their productivity and participation in work and social life.

Ethics

Ethics Committee Approval: The study protocol was approved by the Clinical Research Ethics Committee of University of Health Sciences Turkey, Bakırköy Dr. Sadi Konuk Training and Research Hospital on 08.04.2019 (protocol no: 2019/168, decision no: 2019-07-16).

Informed Consent: Informed consent was obtained from all participants in this study.

ClinicalTrials.gov Identifiers: NCT04749537

Footnotes

Authorship Contributions

Concept: Ö.F.B., D.B., Design: Ö.F.B., D.B., Data Collection or Processing: Ö.F.B., E.K., M.A., D.B., Analysis or Interpretation: Ö.F.B., D.B., Literature Search: Ö.F.B., E.K., M.A., D.B., Writing: Ö.F.B.

Conflict of Interest: No conflict of interest was declared by the authors.

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