

# Evaluating loss of productivity in patients with rheumatoid arthritis and its relationship to clinical parameters

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## Abstract

**Aim:** This study investigated loss of productivity of working women and housewives with rheumatoid arthritis (RA) and analyzed the correlation of this loss with disease activity parameters and health-related quality of life.

**Material and Methods:** The study enrolled consecutive patients presenting to rheumatology outpatient clinic between April 2016 and September 2016 who met the American College of Rheumatology (ACR)/European League Against Rheumatism (EULAR) RA classification criteria. Disease activity with the Disease Activity Score (DAS-28) as it pertains to C-reactive protein (CRP), functional status with the Duruöz hand index, activities of daily life with the Health Assessment Questionnaire (HAQ), and health-related quality of life with the short-form 36 (SF-36) questionnaire.

**Results:** This study included 82 RA patients (56 women, 26 men) who were followed in our rheumatology outpatient clinic, and 29 healthy controls (24 women, 5 men) who were patient accompanists and patient visitors. We found no difference between housewives and employed women with RA in terms of disease activity, productivity in daily activities, anxiety, or depression, but patients with RA had higher pain, fatigue, and anxiety scores than healthy controls. Loss of productivity in daily activities was found to be correlated with disease activity and fatigue.

**Conclusions:** In conclusion, disease activity, quality of life, and functional status are equally important in RA patients who work as housewives or in the workforce. Emotional status has an impact, especially on increasing productivity and participation in daily life, and doctors should also examine their patients from this perspective.

**Keywords:** Rheumatoid Arthritis; Work Disability; Quality of Life.

## INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease of unknown etiology that has the greatest impact on patients during their most productive years (1).

Approximately 20% of RA patients are unable to work in the first 2~3 years of the disease, and the frequency of work disability increases over time so that one-third of all patients are unable to work within 10 years following diagnosis (2-7). Disease activity and severity, functional disability, and morning stiffness have been reported to increase the inability of patients with arthritis to work (8-11). Advanced age, female gender, comorbid conditions, low education level, and jobs requiring physical work are all patient-related risk factors (9,12,13). Wallenius et al (12). reported that poor health is correlated with an inability to work.

While previous studies have examined parameters such

as efficiency at work, work attendance, and changes in the working conditions conducted by RA patients, the efficiency of housewives with RA in performing their daily activities and their social participation have not been emphasized. Most women in underdeveloped societies are housewives and do not work because they do not have a particular profession. In developed societies, women have professions and work within the general workforce, and most studies are performed on working women (5-12). Therefore, current data on housewives are insufficient.

This study investigated the loss of productivity of working women and housewives with RA that developed during their working life, and analyzed the correlation of this loss with disease activity parameters, health-related quality of life, anxiety, and depression.

## MATERIAL and METHODS

This study enrolled consecutive patients, presenting

**Received:** 15.05.2018 **Accepted:** 18.06.2018 **Available online:** 26.6.2018

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to the rheumatology outpatient clinic between April 2016 and September 2016, who met the 2010 American College of Rheumatology (ACR)/European League Against Rheumatism (EULAR) RA classification criteria.

The control group was recruited from patient accompanists with no known musculoskeletal diseases and patient visitors; the two groups were matched for age and gender. The study used a prospective, cross-sectional design. Patient age, gender, body mass index (BMI), education status, disease duration, occupation, comorbidities, any drugs used, and demographic data were recorded. In accordance with the principles of the Declaration of Helsinki, the study was approved by Sakarya University local ethics committee and written consent was obtained from all patients.

Patients younger than 18 years or older than 70 years, pregnant and lactating women, and those with orthopedic problems, psychiatric disorders, severe systemic diseases that would prevent working (cardiovascular, respiratory, or severe gastroenterological or metabolic pathologies) or any another inflammatory disease were excluded from the study.

#### **Indices used for evaluating disease activity, functional status, and quality of life**

Pain level was assessed in all patients with a 10-cm visual analogue scale (VAS), disease activity with the Disease Activity Score (DAS-28) as it pertains to C-reactive protein (CRP), functional status with the Duruöz hand index, activities of daily life with the Health Assessment Questionnaire (HAQ), and health-related quality of life with the short-form 36 (SF-36) questionnaire (14,15).

#### **Assessment of depression and anxiety**

The risks for depression and anxiety were assessed with the Hospital Anxiety and Depression Scale (HADS). This scale was developed for determining the risk of anxiety and depression in patients, and for measuring severity and changes therein. Aydemir et al (16). examined the validity and reliability of the Turkish version of the HADS. The lowest score that the patients can obtain for both subscales is 0, and the highest is 21. Cut-off points for the Turkish version of the HADS are 10 for the anxiety subscale (HAD-A) and 7 for the depression subscale (HAD-D) (16).

#### **Assessment of lost labour**

To assess the difficulty patients experience at work, the Work Productivity and Activity Impairment Questionnaire: Specific Health Problems (ver. 2.0; WPAI: SHP) was used (17).

The WPAI measures the effects of health and symptom severity on work productivity and non-work related activities. There are two different versions of the WPAI: the general health (WPAI:GH) and the specific health problem (WPAI:SHP). The WPAI:SHP was designed for application to any health problem by identifying the disease or condition in the questions asked (17).

There are six questions in the WPAI:SHP, each requiring a single response: present work status (Q1); number of work days missed because of health problems (Q2); number of work days missed for other reasons (Q3); hours worked (Q4); impact of health status on work productivity (Q5); and impact of health status on ordinary (non-work) activities (Q6). The answer options are as follows: Q1, yes/no; Q2–Q4, number of hours (numerical data); Q5, global pain score on a scale ranging from 0–10 (0, health problems have no impact on my work; 10, health problems prevent me from working); and Q6, global pain score, on a 0–10 scale (0, health problems have no impact on my daily activities; 10, health problems prevent me from performing my daily activities). The WPAI:SHP evaluates the patient's experience over the past 7 days (17).

#### **Statistical Analysis**

The NCSS 2007 software package (NCSS Statistical Software, Kaysville, UT, USA) was used for the statistical analyses. The data were evaluated using descriptive statistics (means, standard deviations, medians, frequency rates, and ranges). For quantitative data, Student's t-test was used to compare two groups on variables showing a normal distributions and the Mann–Whitney U test to compare two groups on non-normal variables. Pearson's chi-square test, the Fisher–Freeman–Halton test, Fisher's exact test, and Yates' continuity correction test (Yates corrected chi-square) were used for comparing qualitative data. Spearman's correlation analysis was used to assess inter-variable correlations. Significance was evaluated at the  $p < 0.01$  and  $p < 0.05$  levels.

## **RESULTS**

This study included 82 RA patients (56 women, 26 men) who were followed in our rheumatology outpatient clinic, and 29 healthy controls (24 women, 5 men) who were patient accompanists and patient visitors.

Of the patients, 65.9% ( $n = 54$ ) were taking conventional synthetic disease-modifying anti-rheumatic drugs (DMARDs) and 29.3% ( $n = 24$ ) were undergoing tumor necrosis factor (TNF)-blocking therapy. Of the patient group, 34.1% had comorbid diseases: 20.7% had hypertension (HT), 6.1% had hypothyroidism, 3.7% had diabetes mellitus (DM), and 3.7% had coronary heart disease. Table 1 compares the demographic characteristics of the two groups.

Table 2. compares the disease parameters of the RA patients continuing in their job and the housewives with RA.

Table 3. compares disease-related parameters between housewives with RA and healthy controls.

Anxiety was significantly positively correlated with the Duruöz hand index and HAQ scores ( $p = 0.027$ ,  $r = 0.279$  and  $p = 0.011$ ,  $r = 0.318$ , respectively), as shown in Table 4.

Table 1. Demographic characteristics, disease activity indices, rates of depression and anxiety of the groups

|                          |                           | RA Group (n=82) | Control Group (n=29) | p       |
|--------------------------|---------------------------|-----------------|----------------------|---------|
| Age (years)              |                           | 50.54±11.78     | 52.68±6.57           | 0.732   |
| BMI (kg/m <sup>2</sup> ) |                           | 28.56±3.51      | 29.16±2.13           | 0.084   |
| Gender                   | Female                    | 56 (68.3)       | 24 (82.8)            | 0.103   |
|                          | Male                      | 26 (31.7)       | 5 (17.2)             |         |
| Education status         | Primary school            | 45 (54.9)       | 13 (44.8)            | 0.015   |
|                          | Junior high school        | 9 (11.0)        | 2 (6.9)              |         |
|                          | High school               | 16 (19.5)       | 10 (34.5)            |         |
|                          | University                | 10 (14.6)       | 4 (13.8)             |         |
| Smoking                  | Non-smoker                | 62 (75.6)       | 24 (82.8)            | 0.303   |
|                          | Smoker                    | 20 (24.4)       | 5 (17.2)             |         |
| Occupation               | Continues at present work | 33 (40.2)       | 0 (0)                | 0.005   |
|                          | Housewife                 | 49 (59.8)       | 100 (100.0)          |         |
| VAS Pain                 |                           | 4.10±2.39       | 0.00±0.00            | <0.001  |
| VAS Fatigue              |                           | 5.02±2.83       | 0.51±1.21            | <0.001  |
| Duruöz                   |                           | 9.69±11.34      | 0.51±1.29            | <0.001  |
| HAQ                      |                           | 9.36±8.90       | 0.31±0.47            | <0.001  |
| SF36                     | Physical Function         | 40.69±42.78     | 44.17±27.81          | 0.025   |
|                          | Physical Role Difficulty  | 12.89±5.67      | 14.91±3.42           | 0.132   |
|                          | Pain                      | 45.60±30.97     | 21.20±20.85          | 0.003   |
|                          | General Health            | 16.60±8.23      | 58.70±2.69           | <0.001  |
|                          | Vitality (Energy)         | 16.09±5,14      | 13.74±2.81           | 0.044   |
|                          | Social Function           | 8.70±3.61       | 8.37±3.51            | 0.641   |
|                          | Emotional Role Difficulty | 10.63±3.93      | 10.22±3.65           | 0.306   |
| HDS Anxiety              | Mental Health             | 1.66±8.23       | 5.87±2.69            | <0.001  |
|                          |                           | 6.82±4.00       | 3.73±2.60            | a<0.001 |
| HDS Anxiety              | Anxiety absent (<7)       | 67 (81.7)       | 29 (100.0)           |         |
|                          | Anxiety present (≥7)      | 15 (18.3)       | 0 (0.0)              |         |
| HDS Depression           |                           | 5.86±2.99       | 4.36±2.47            | a0.013  |
| HDS Depression           | Depression absent (<10)   | 55 (67.1)       | 22 (75.9)            |         |
|                          | Depresyon present (≥10)   | 27 (32.9)       | 7 (24.1)             |         |

BMI (body mass index); VAS (visual analogue scale), HAQ (Health Assessment Questionnaire), SF-36 (short-form36 questionnaire), HADS (Hospital Anxiety and Depression Scale)

**Table 2. Comparison of disease activity parameters, anxiety and depression of working RA patients and housewivs with RA**

|                | Working RA group (n=33)   | Housewife RA group (n=49) | P            |              |
|----------------|---------------------------|---------------------------|--------------|--------------|
| VAS Pain       | 4.90±2.06                 | 3.57±2.47                 | <b>0.021</b> |              |
| VAS Fatigue    | 5.12±2.43                 | 4.95±3.10                 | 0.920        |              |
| Duruöz         | 7.30±4.23                 | 11.30±14.09               | 0.725        |              |
| DAS28          | 2.95±0.74                 | 2.67±0.88                 | 0.091        |              |
| HAQ            | 8.90±6.61                 | 9.67±10.21                | 0.694        |              |
| WPAI 5         | 4.75±1.76                 | 0.32±1.35                 | <0.001       |              |
| WPAI 6         | 4.84±1.67                 | 4.0±2.23                  | 0.095        |              |
| HAD-Depression | 0.21±0.41                 | 0.40±0.49                 | 0.066        |              |
| HAD-Anxiety    | 0.18±0.39                 | 0.18±0.39                 | 0.983        |              |
| SF-36          | Physical Function         | 59.90±32.86               | 27.75±44.09  | <0.001       |
|                | Physical Role Limitation  | 9.57±6.65                 | 15.2±3.48    | <0.001       |
|                | Emotional role limitation | 11.36±4.25                | 10.13±3.66   | <b>0.010</b> |
|                | Vitality                  | 11.92±3.39                | 18.89±4.12   | <0.001       |
|                | Social Functions          | 8.47±3.97                 | 8.86±3.37    | 0.511        |
|                | Body Pain                 | 1.31±2.41                 | 6.76±3.25    | <0.001       |
|                | Mental Health             | 21.49±5.53                | 21.47±4.59   | 0.831        |

Mann Whitney U Test \*p<0,05 \*\*p<0,0, Data were shown as mean±standard deviation or count (n) and percentage (%). DAS-28 (Disease activity index), HAQ (Health Assessment Questionnaire), WPAI (Work Productivity and Activity Impairment Questionnaire): Specific Health Problems (ver. 2.0); HADS, (Hospital Anxiety and Depression scale); SF-36, (short-form 36 questionnaire) PF; physical functionPRD; Physical role difficulty, ERD; Emotional role difficulty

**Table 3. Comparison of some parameters between housewives with RA and healthy housewives**

|                | Housewives with RA group (n=49) | Control group (n=29) | P            |              |
|----------------|---------------------------------|----------------------|--------------|--------------|
| VAS Pain       | 3.57±2.47                       | 0.51±1.12            | <0.001       |              |
| VAS Fatigue    | 4.95±3.10                       | 0.51±1.29            | <0.001       |              |
| Duruöz         | 11.30±14.09                     | 0.37±0.72            | <0.001       |              |
| DAS28          | 9.67±10.21                      | 0.31±0.47            | <0.001       |              |
| HAQ            | 0.32±1.35                       | 0.00±0.00            | 0.117        |              |
| WPAI 5         | 4.00±2.23                       | 0.62±1.26            | <0.001       |              |
| WPAI 6         | 0.40±0.49                       | 0.24±0.43            | 0.137        |              |
| HAD-Depression | 0.18±0.39                       | 0.0±0.0              | <b>0.015</b> |              |
| HAD-Anxiety    | 0.18±0.39                       | 0.18±0.39            | 0.983        |              |
| SF-36          | Physical Function               | 27.75±44.09          | 48.13±26.94  | <0.001       |
|                | Physical Role Limitation        | 15.12±3.48           | 14.91±3.42   | 0.493        |
|                | Emotional role limitation       | 10.13±3.62           | 10.22±3.66   | 0.901        |
|                | Vitality                        | 18.89±4.12           | 13.74±2.81   | <0.001       |
| SF-36          | Social Functional               | 8.86±3.37            | 8.37±3.51    | 0.469        |
|                | Body Pain                       | 6.76±3.25            | 2.12±2.85    | <0.001       |
|                | Mental Health                   | 21.47±4.59           | 24.88±5.25   | <b>0.003</b> |

Data were shown as mean±standard deviation or count (n) and percentage (%). Mann Whitney U Test \*p<0.05 \*\*p<0.01 VAS (visual analogue scale). DAS-28 (Disease Activity Score). HAQ8 Health Assessment Questionnaire). WPAI (Work Productivity and Activity Impairment Questionnaire). Specific Health Problems (ver. 2.0). HADS (Hospital Anxiety and Depression scale). SF-36 (short-form 36 questionnaire)

**Table 4. Distribution of correlations between impact level of health problems on ability to perform daily activities other than work in the last seven days and other disease parameters (RA+control)**

|                     | WPAI 6       |                  |
|---------------------|--------------|------------------|
|                     | r            | p                |
| Age at diagnosis    | 0.009        | 0.950            |
| HDS-Anxiety         | 0.172        | 0.177            |
| HDS-Depression      | 0.064        | 0.619            |
| Duruöz manula index | <b>0.622</b> | <b>&lt;0.001</b> |
| DAS28               | <b>0.514</b> | <b>&lt;0.001</b> |
| HAQ                 | <b>0.661</b> | <b>&lt;0.001</b> |
| VAS fatigue         | <b>0.739</b> | <b>&lt;0.001</b> |

r=Spearman's coefficient of correlation \*p<0.05,\*\*p<0.01,, HADS (Hospital Anxiety and Depression scale), DAS-28 (Disease Activity Score), HAQ (Health Assessment Questionnaire), VAS (visual analogie scale), WPAI 6 (Work Productivity and Activity Impairment Questionnaire)

## DISCUSSION

This is the first study to investigate the correlations of work productivity, disease activity, and depression among housewives and workers with RA. We found that there was no difference between housewives and workers with RA in terms of disease activity, productivity in daily activities, anxiety, or depression, but patients with RA had higher pain, fatigue, and anxiety scores than healthy controls. The loss of productivity in daily activities was found to be correlated with disease activity and fatigue.

Rheumatoid arthritis is an inflammatory disease that is seen most frequently in women of working age. Accordingly, previous studies have examined how these patients cope in their daily lives and work lives. A multicenter study performed in Argentina in 2009 reported that 49% of RA patients had work disabilities (19). Many other studies have examined work productivity, absenteeism rates, the impact of occupational conditions, and loss from the labor force among RA patients (2-13).

Various questionnaires are used for measuring loss of productivity and work disability among patients with rheumatic diseases. These questionnaires have proven reliability and validity for numerous diseases (19,20). Nevertheless, there is no ideal instrument for assessing productivity loss (21-23). The WPAI Questionnaire was specially developed for measuring the impact of specific diseases on work productivity (24-26).

An arthritis cohort study reported early retirement rates of 10~30% in the first year of RA (27,28). The multinational QUEST-RA trial reported that 20% of RA patients were unable to work within 2 years (5). Novel developments in the treatment of RA have reduced disease activity, and decrease in the early retirement rate among German RA patients with in the last 10 years was reported (29).

Disease activity and severity, functional impairment, and morning stiffness are reported to increase work disability in arthritis patients (8-11). Studies have shown that

disease activity is correlated with an inability to work and decreased work productivity (30). By contrast, Geuskens et al. (31) found no correlation between disease activity and work productivity in patients with inflammatory arthritis for less than 12 months. Performance of activities of daily life, assessed using the HAQ, is among the variables most frequently associated with work disability in various studies (32-34). In our study of patients with RA, we found strong correlations between disease activity and HAQ scores, productivity at work, and productivity in daily life, but not with duration of disease.

In a study of 483 RA patients, the 21% who were unemployed had higher levels of disease activity and lower capacity to perform activities of daily life, and shorter school attendance compared with the employed patients (35). In another multicenter study of 172 patients, discordance was found between activities of daily life and work productivity in 40% of the patients; the study found that a lower capacity to perform activities of daily life and a worse quality of life were correlated with work disability (36). In this study, when we compared workers and housewives with RA, the two groups showed similar loss of productivity in activities of daily life and housewives had at least as much difficulty performing the daily life tasks as did the employed subjects. This difficulty was most strongly correlated with disease activity and the disease-related quality of life. Our results suggest that, even in those who are unemployed, disease-related disability significantly affects the activities of the daily life of RA patients, where paid work does not show a strong association with to the degree of disability.

Many studies have examined the presence of depression and anxiety in patients with RA. While Covic et al. (37) found a higher rate of anxiety versus depression in RA patients, Murphy et al. (38) found no difference in the rates of depression and anxiety. Studies have shown strong correlations of anxiety and depression with pain and functional status (37, 39). Similarly, when we analyzed our RA patients as a whole, we also found significantly higher rates of anxiety and depression compared with the healthy controls. When we compared the RA subgroups, we found no difference between housewives and working people in terms of anxiety and depression levels. Anxiety was correlated with loss of productivity in activities of daily life, disease-specific quality of life, and functional status in the RA subgroups. Further analysis revealed that anxiety was directly correlated with disease-specific quality of life in housewives with RA, but not with productivity in daily life.

Our study had some limitations. First, it used a cross-sectional design wherein patient status pertained only to that during the previous week. Follow-up studies including larger patient groups should yield more information on this subject.

## CONCLUSION

This study compared the productivity, daily activities, disease-specific parameters, and anxiety and depression



levels of housewives with RA, working people with RA and healthy controls. Although they are not in the workforce, housewives also have at least as much difficulty in performing activities of daily life as do employed RA patients; moreover, their disease-related quality of life is low and they have similar rates of depression and anxiety. We have shown the important roles of disease activity and functional status in the productivity of RA patients: disease activity, quality of life, and functional status are equally important in housewives with RA and those who are employed. Emotional status has an impact on productivity and participation in daily life and doctors should evaluate their patients from this perspective. Larger cohort studies on this subject are needed.

*Competing interests: The authors declare that they have no competing interest.*

*Financial Disclosure: There are no financial supports*

*Ethical approval: Sakarya University local ethics committee and written consent was obtained from all patients.*

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