

# Younger Patients With Rheumatoid Arthritis Are as Dependent in Activities of Daily Living as Their Older Counterparts

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## Research

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# Abstract

**Background:** Rheumatoid arthritis is an important cause of disability and dependency in older adults. We aimed to assess dependency in activities of daily living in younger and older patients with rheumatoid arthritis and to seek factors underlying dependency in activities of daily living.

**Methods:** In this cross-sectional study, we assessed dependency in basic and instrumental activities of daily living; disease activity; quality of life; depression; anxiety; and fatigue in the rheumatology clinic of a university hospital. Univariate analyses and a logistic regression analysis were performed to determine factors associated with dependency.

**Results:** We enrolled 76 patients with a mean age of  $57 \pm 11.1$  (range 31-78). The rate of dependency in instrumental activities of daily living was high in younger (56.1%) and older (51.4%) patients. The rate of dependency in basic activities of daily living was 14.6% in younger and 14.3% in older patients. A higher depression score and female gender had significant associations with dependency in instrumental activities of daily living.

**Conclusion:** The rate of dependency in basic and instrumental activities of daily living is high in younger and older patients with rheumatoid arthritis. Depression seems to be an independent and important factor underlying dependency. Further studies are needed to investigate the mechanisms of this association and test the effect of antidepressant treatment on dependency in rheumatoid arthritis.

## Introduction

Despite the better treatment options and outcome, rheumatoid arthritis (RA) remains to be an important cause of disability and care dependency. Joint pain and deformities, anemia, myopathy associated with corticosteroids, and medical illness related depression (MIRD) are among the factors influencing life quality and precipitating fatigue and disability in these patients. Because older adults are at increased risk for being dependent, older adults with RA may be at even higher risk for care dependency. Finding out causes of disability in patients with RA may facilitate development of measures to preserve independency in these patients. There is a recent trend toward exploring factors underlying disability in patients with RA [1–10]. Older adults are at a high risk for disability and inflammatory rheumatic disorders such as RA may further increase this risk. To date, only a few studies have focused on disability in older adults with RA [5, 11, 12]. We aimed to assess the rates of functional dependency in basic and instrumental ADL in younger and older patients with RA. We also aimed to determine factors underlying functional dependency in these patients.

## Patients And Methods

We performed this cross-sectional study in the outpatient rheumatology clinic of a university hospital. We enrolled consecutive community-dwelling adult patients who were under follow up for established RA according to the 2010 ACR/EULAR classification criteria [13] and provided informed consent. Exclusion

criteria were being younger than 18 years old at the study period or at the time of diagnosis of RA, having symptomatic chronic heart disease, a history of stroke, and presence of significant cognitive dysfunction that may impede filling out the questionnaires. The local ethical committee approved the study protocol and we carried out the study in accordance with the Helsinki declaration and its later amendments.

We recorded demographic characteristics, disease duration, creatinine, hemoglobin, and erythrocyte sedimentation rate (ESR). We used Katz scale to assess basic activities of daily living (ADL) [14] and Lawton & Brody scale to assess instrumental ADL [15]. Katz basic ADL scale is used to assess dependency in bathing, dressing, toileting, transferring, continence, and feeding [14]. Lawton & Brody instrumental ADL scale is used to evaluate dependency in using telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, management of own medications, and handling finances [15]. Three of the items of instrumental ADL are omitted in men: laundry, food preparation, and housekeeping. The subjects are questioned if they are completely or partially dependent on the basic and instrumental ADL. Dependence in any of the activities is defined as any dependence in ADL or IADL.

We also used disease activity score in 28 joints (DAS28) to assess disease activity, health assessment questionnaire (HAQ) and rheumatoid arthritis quality of life (RAQOL) to assess quality of life (QOL) [16], and functional assessment of chronic illness therapy-fatigue (FACIT-F) to assess severity of fatigue [17]. We also used visual analogue scale (VAS) to assess patient reported disease activity and pain. The presence and severity of depressive and anxiety symptoms were evaluated using Beck depression inventory and Beck anxiety questionnaires, respectively [18, 19].

The subjects were grouped according to age (< 60 years old, younger age group;  $\geq$  60 years old, older age group), presence or absence of dependency (any dependency or no dependency) and fatigue. We used the recommended FACIT-F score of lower than 30 (one standard deviation lower than the general population) to identify presence of fatigue [17]. We calculated estimated glomerular filtration rate (GFR) levels using the CKD-EPI-creatinine formula [20].

## **Statistical Analysis**

We determined the normality of distribution of continuous variables using the Kolmogorov-Smirnov test and compared categorical variables with Chi square or Fischer's exact tests and continuous variables using Student's t test or Mann-Whitney U test where compatible. We tested the correlations between the variables using Pearson's or Spearman's tests where appropriate. We performed a multivariate binary logistic regression analysis to assess factors independently associated with the presence of any dependency in instrumental ADL. We used the factors which had significant ( $p < 0.05$ ) or borderline ( $p < 0.25$ ) associations with dependency as covariates in the regression analysis. We did not include factors with collinearity in the regression analysis. In all analyses, we accepted a two-sided p value of  $< 0.05$  as statistically significant.

## **Results**

A total of 76 patients (84.2% females) with a mean age of  $57 \pm 11.1$  (range 31–78) were enrolled. General characteristics of these subjects are shown in Table 1. The mean ages of the younger and older patient groups were  $48.8 \pm 7.8$  and  $66.6 \pm 4.9$ , respectively. The rate of female gender was 90.2% and 77.2%, respectively in the younger and older patient groups. A few of the patients had late-onset RA (onset at  $\geq 60$  years,  $n = 7$ , 9.2%). Thirty-five (46.1%) of the patients were in the older age group. Among the patients, 53.9% had dependency at least in one instrumental ADL and 14.5% had dependency at least in one basic ADL.

Table 1  
Characteristics of the study population and comparison of younger and older patient groups

	Overall (n = 76)	Younger group (n = 41)	Older group (n = 35)	P*
Age (years)	$57 \pm 11.1$	$48.8 \pm 7.8$	$66.6 \pm 4.9$	<b>&lt; 0.001</b>
Female gender (n, %)	64, 84.2	37, 90.2	8, 22.9	0.2
Disease duration (years)	$9.6 \pm 7.9$	$8.8 \pm 7.2$	$10.6 \pm 8.6$	0.3
FACIT-F score	$31.4 \pm 13.7$	$32.9 \pm 12.6$	$29.7 \pm 15$	0.3
Fatigue present (%)	46.7	48.6	57.5	0.4
Any dependency in ADL present (%)	14.5	14.6	14.3	0.97
Any dependency in IADL present (%)	53.9	56.1	51.4	0.7
DAS-28	$3.7 \pm 1.4$	$3.5 \pm 1.4$	$3.9 \pm 1.4$	0.3
ESH (mm/h)	$23.7 \pm 17.2$	$19.7 \pm 16.7$	$28.7 \pm 16.7$	<b>0.027</b>
HAQ	$15.2 \pm 13.5$	$13.6 \pm 11.1$	$17.1 \pm 15.8$	0.3
RAQOL	$13.8 \pm 8.3$	$13.3 \pm 8.6$	$14.5 \pm 7.9$	0.5
VAS pain	$30.9 \pm 25.1$	$31.8 \pm 21.9$	$29.9 \pm 28.7$	0.7
VAS general	$39.4 \pm 22.1$	$37.1 \pm 20.1$	$42.1 \pm 24.2$	0.3
Beck depression score	$14.5 \pm 10.1$	$12.3 \pm 9.4$	$17.1 \pm 10.5$	<b>0.04</b>
Beck anxiety score	$13 \pm 9.5$	$12.5 \pm 9.3$	$13.5 \pm 9.8$	0.6
Hemoglobin (g/dl)	$12.3 \pm 1.4$	$12.5 \pm 1.3$	$12.1 \pm 1.5$	0.18
Estimated GFR (ml/min)	$91 \pm 19.3$	$97.8 \pm 18.7$	$82.4 \pm 16.6$	<b>0.001</b>
ADL: activities of daily living, IADL: instrumental ADL, HAQ: health assessment questionnaire, RAQOL: rheumatoid arthritis quality of life, VAS: visual analogue scale, GFR: glomerular filtration rate				
*Significant differences are emphasized with bold text				

The comparison of study variables between the older and younger patient groups is listed in Table 1. The older age group had higher depression scores and lower estimated GFR values compared with the younger age group. The remaining study variables including dependency in basic and instrumental ADL were similar between the older and younger age groups.

The comparison of study variables between the group with any dependency in instrumental and those totally independent in instrumental is listed in Table 2. A higher proportion of the subjects with dependency in instrumental ADL were females (97.6% vs. 68.6%, respectively). The subjects with any dependency in instrumental ADL had worse QOL, more severe disease activity, more intense pain, more depressive and anxiety symptoms, and a higher rate of fatigue. Hemoglobin level tended to be lower, DAS28 scores tended to be higher, and the duration of disease tended to be longer in patients with any dependency in instrumental ADL compared with patients with no dependency in instrumental ADL (these differences were not statistically significant).

Table 2

Comparison of subjects with any dependency in instrumental activities of daily living and those with no dependency

	Any Dependency (n = 41)	No Dependency (n = 35)	p*
Age (years)	57 ± 11.1	57 ± 11.2	1
Female gender (%)	97.6	68.6	<b>0.001</b>
Disease duration (years)	11 ± 7.6	8 ± 8	0.1
Dependency in ADL (%)	26.8	0	<b>0.001</b>
Fatigue present (%)	60	31.4	<b>0.01</b>
DAS-28	4 ± 1.5	3.3 ± 1.3	0.05
ESH (mm/h)	22.9 ± 16	24.8 ± 18.7	0.6
HAQ	21.6 ± 13.3	7.8 ± 9.3	<b>&lt; 0.001</b>
RAQOL	17.2 ± 8	9.8 ± 6.8	<b>&lt; 0.001</b>
VAS pain	36.5 ± 28.1	24.3 ± 19.3	<b>0.03</b>
VAS general	45.4 ± 22.7	32.4 ± 19.5	<b>0.01</b>
Beck depression score	18.3 ± 10.6	10.2 ± 7.6	<b>&lt; 0.001</b>
Beck anxiety score	15.3 ± 10.2	10.3 ± 7.9	<b>0.02</b>
Hemoglobin (g/dl)	12.1 ± 1.4	12.7 ± 1.3	0.08
Estimated GFR (ml/min)	89 ± 21.3	93.4 ± 16.7	0.4
ADL: Activities in daily living, HAQ: health assessment questionnaire, RAQOL: rheumatoid arthritis quality of life, VAS: visual analogue scale, GFR: glomerular filtration rate			
*Significant differences are emphasized with bold text			

The rate of dependency in instrumental ADL in males was 8.3% while it was 62.5% in females ( $p = 0.001$ ). On the other hand, the rate of dependency in basic ADL was similar in males and females (8.3% vs. 15.6%, respectively,  $p = 1$ ). Male and female subjects had similar mean ages ( $61 \pm 12.4$  vs.  $56.3 \pm 10.8$ , respectively,  $p = 0.18$ ). Among the study subjects, males and females had similar depression scores ( $13.5 \pm 13.3$  vs.  $14.7 \pm 9.6$ ,  $p = 0.76$ ).

There was a negative and strong correlation between the instrumental ADL and depression scores ( $r = -0.52$ ,  $p < 0.001$ ). Similarly, basic ADL had a negative and moderate correlation with depression scores ( $r = -0.36$ ,  $p = 0.001$ ).

A multivariate logistic regression analysis revealed that female gender and higher depression scores were independent predictors of any dependency in instrumental ADL (Table 3,  $r^2$  of the model 0.4). Other

covariates, which consisted of age, disease duration, fatigue, and DAS28 score, did not have significant associations with dependency in instrumental ADL in the multivariate regression analysis.

Table 3  
Multivariate logistic regression analysis for any dependency in instrumental activities of daily living

r <sup>2</sup> of the model 0.4	OR	95% CI	p*
Age (years)	0.99	0.93–1.05	0.7
Gender	56.7	2.2–1445	<b>0.014</b>
Beck depression score	1.13	1.03–1.25	<b>0.012</b>
Disease duration (years)	1.04	0.97–1.12	0.27
Fatigue	1.007	0.2–4.5	0.99
DAS28	0.99	0.6–1.6	0.98
*Significant values are noted using bold text.			

## Discussion

We assessed the effect of several clinically relevant variables on dependency in instrumental ADL in younger and older patients with RA in this study. Mean depression score was higher and mean estimated GFR level was lower in the older age group. The remaining study variables were similar between the younger and older age groups. A higher depression score and female gender were factors independently associated with dependency in instrumental ADL. Interestingly, despite the higher depression score in the older age group and the independent association between depression and dependency in instrumental ADL, the rate of dependency was similar in younger and older age groups. The findings of our study indicate that there is a high rate of dependency in instrumental ADL in both younger and older patients with RA. The presence of depressive symptoms seemed to be the most important factor underlying dependency in instrumental ADL.

There is limited data about dependency in ADL in patients with RA. The instruments used and items assessed vary between studies. Although Katz basic ADL and Lawton & Brody instrumental ADL assessment scales have been used extensively in geriatrics practice and research, they have rarely been used in patients with RA, if ever. To our knowledge, the Lawton & Brody instrumental ADL scale was used only in one study which evaluated 16 patients with RA among an older adult population (> 75 years old) of 601 persons [21]. In that study, half of patients with RA had dependency at least in one instrumental ADL [21]. Hammond et al. [1] assessed self-care and mobility using Evaluation of Daily Activity Questionnaire, which consists of 138 items in 14 domains, among 502 participants with RA and reported that the English version of this questionnaire had robust reliability and validity. In their qualitative study, Poh et al. [2] reported that physical and psychosocial challenges affected daily and social activities of

patients with RA. Katz et al. [22] observed that patients with RA who had functional limitations spent more time in obligatory activities of their daily life. Katz et al. [4] also interviewed 548 individuals with RA annually by telephone to investigate disability using a 26-item Valued Life Activity (VLA) scale. In their study, approximately half of the study participants were unable to perform at least one VLA and disease status measures and HAQ score were robust predictors of disability [4]. However, most of these studies did not specifically evaluate presence or absence of depression in their participants.

A few studies investigated the effect of depression on ADL in patients with RA. Karpouzas et al. [3] reported that disease activity, depression, and pain contributed significantly to disability as assessed by HAQ-disability index in vulnerable Hispanic patients with RA living in the United States. Morris et al. [23] reported that depression had significant adverse effects over time on daily functioning in a representative community sample of patients with RA. The findings of our study also underscore that depressive symptoms substantially influence instrumental ADL, independent from many clinical variables routinely followed up in these subjects. Despite the fact that basic and instrumental ADL have paramount importance in everyday life, dependency in ADL has only recently drawn some interest in patients with RA. Along with the global aging phenomenon, there is need for an increased awareness about dependency in these activities to better treat patients with RA who are at a substantially increased risk for these challenges. Because specific antidepressant treatment may lead to improvement in wellbeing and QOL of these subjects, it may be rational to enhance awareness about depressive symptoms of these patients among rheumatologists. Furthermore, the potential effect of antidepressant treatment on several outcomes may be worth being investigated in these patients.

The other factor independently associated with dependency in instrumental ADL was female gender in our study. To our knowledge, the effect of gender on instrumental ADL has not been specifically investigated in patients with RA. Of note, three of eight items of IADL are omitted in men: laundry, food preparation, and housekeeping. Therefore, the risk of dependence in IADL is generally lower in men. This may be a limitation of the scale when both genders are compared in terms of IADL dependency. Furthermore, basic ADL is assessed in the same manner in both genders. Qualitative studies are needed to better interpret the effect of gender on instrumental ADL in these patients.

Although the GFR level was lower in the older age group, almost all of the patients had an estimated GFR level above 60 ml/min/1.73 m<sup>2</sup>. Moreover, patients with and without dependency in IADL had similar GFR levels. Therefore, we do not think that chronic kidney disease has an important effect on the study outcomes.

Among the limitations of our study are the limited sample size, cross-sectional design, and absence of a validated assessment regarding presence of major depression. Moreover, we did not have information if the patients had an established diagnosis of major depression and whether they used antidepressant medications. Another limitation is lack of assessment of sleep disorders, which may also be a confounding factor.

# Conclusions

In conclusion, the findings of our study indicate that dependency in instrumental ADL is rather common in both younger and older patients with RA. Notably, dependency in instrumental ADL had a similar frequency in younger and older subjects. The presence of depressive symptoms and female gender were significant and independent risk factors for dependency in instrumental ADL. There is need for detailed assessment regarding major depressive disorders and MIRD in these patients because these conditions may be easily overlooked especially in older patients with RA because of atypical presentations. Further studies are needed to investigate the effect of antidepressant treatment on dependency in basic and instrumental ADL in patients with RA.

# Declarations

## **Ethics approval and consent to participate**

The protocol for the research project has been approved by a suitably constituted Ethics Committee of the institution within which the work was undertaken. All of the patients provided informed consent to be enrolled in this study.

## **Consent for publication**

Not applicable.

## **Availability of data and materials**

We agree that the materials described in the manuscript, including all relevant raw data, will be freely available to any scientist wishing to use them for non-commercial purposes, without breaching participant confidentiality.

## **Competing interests**

The authors declare that there are no conflicts of interest.

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The authors have nothing to disclose.

## **Authors' contributions**

All authors contributed to the design and performance of this study and in writing and critical revision of the final manuscript.

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