



Reliability and Validity of the Turkish Version of the Arthritis-work Spillover Scale in Individuals with Rheumatoid Arthritis

Romatoid Artritli Bireylerde Artrit-aşırı İş Yükü Ölçeğinin Türkçe Versiyonunun Güvenirliği ve Geçerliği

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ABSTRACT

Objective: The aim of this study is to adapt the arthritis-work spillover (AWS) scale for Turkish and to examine its validity and reliability.

Methods: The study included 60 individuals with rheumatoid arthritis. AWS scale, disabilities of the arm, shoulder and hand questionnaire (DASH) and its subscale DASH-work module (DASH-W), arthritis impact measurement scales (AIMS2), disease activity score 28 (DAS28), and Canadian occupational performance measure (COPM) were administered to the participants. Internal consistency analysis, Cronbach's alpha coefficient, test-retest method, confirmatory factor analysis, convergent validity were used for validity and reliability analysis.

Results: Cronbach's alpha coefficient was used for internal consistency and the result was 0.86. The test-retest reliability coefficient was 0.68 ($p<0.05$). In the convergent validity analysis, moderately significant correlations were observed between the AWS and DASH-W ($r=0.528$, $p<0.05$), AIMS2-role ($r=0.486$, $p<0.05$), COPM-performance ($r=-0.416$, $p<0.05$) and COPM-satisfaction scores ($r=-0.435$, $p<0.05$). The AWS demonstrated good structural fit. High correlations were observed between AWS and AIMS2-symptom, moderate correlations with DASH, AIMS2-physical, AIMS2-affect, and low correlations with DAS28 ($p<0.05$).

Conclusion: The results of this study showed that the Turkish version of the AWS was valid and reliable evaluation. The AWS scale should be used in clinics by clinicians such as physiotherapists,

ÖZ

Amaç: Bu çalışmanın amacı, artrit-aşırı iş yükü (AAİY) ölçeğinin geçerliğini ve güvenilirliğini Türk toplumuna uyarlamaktır.

Yöntemler: Çalışmaya romatoid artritli 60 birey dahil edildi. Katılımcılara AAİY ölçeği, kol, omuz ve el engellilik anketi (DASH) ve alt ölçeği DASH-iş modülü (DASH-W), artrit etki ölçüm ölçekleri (AIMS2), hastalık aktivite puanı (DAS28) ve Kanada aktivite ve performans ölçümü (COPM) uygulandı. Geçerlik ve güvenilirlik analizi için iç tutarlılık analizi, Cronbach alfa katsayısı, test-tekrar test yöntemi, doğrulayıcı faktör analizi, yakınsak geçerlilik kullanıldı.

Bulgular: İç tutarlılık için Cronbach alfa katsayısı kullanıldı ve sonuç 0,86 olarak bulundu. Test-tekrar test güvenilirlik katsayısı 0,68 ($p<0,05$) olarak bulundu. Yakınsak geçerlilik analizinde AAİY ölçeği ile DASH-W ($r=0,528$, $p<0,05$), AIMS2-rol ($r=0,486$, $p<0,05$), COPM performans ($r=-0,416$, $p<0,05$) ve COPM memnuniyet puanları ($r=-0,435$, $p<0,05$) arasında orta düzeyde anlamlı korelasyonlar gözlemlendi. AAİY, ölçek yapısının iyi uyumunun kanıtını sağladı. AAİY ile; AIMS2-belirti arasında yüksek korelasyon, DASH, AIMS2-fiziksel, AIMS2-etki arasında orta düzeyde korelasyonlar ve DAS28 ile düşük düzeyde korelasyonlar gözlemlendi ($p<0,05$).

Sonuç: Bu çalışmanın sonuçları AAİY ölçeğinin Türkçe versiyonunun geçerli ve güvenilir bir değerlendirme olduğunu göstermiştir. AAİY ölçeği, fizyoterapistler, hekimler, ergoterapistler ve psikologlar gibi klinisyenler tarafından kliniklerde kullanılmalı

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ABSTRACT

physicians, occupational therapists and psychologists etc. to determine the problems experienced by patients in their professional lives and could also be a guide in planning work and occupational programmes of patients.

Keywords: Rheumatoid arthritis, work, functionality, validity, reliability

ÖZ

ve hastaların mesleki yaşamlarında yaşadıkları sorunları belirlemede ve ayrıca hastaların iş ve mesleki programlarını planlamada bir rehber olabilir.

Anahtar Kelimeler: Romatoid artrit, iş, işlevsellik, geçerlik, güvenilirlik

Introduction

Having a job is highly beneficial for individuals with physical limitations by strengthening a sense of purpose, improving economic and emotional well-being, and promoting self-efficacy (1). Although current treatment approaches have improved the lives of individuals with arthritis, research shows that there are still work limitations (2). The challenges of working with rheumatoid arthritis (RA) include dealing with disease symptoms, as well as activity limitations in work tasks. Work can also be made more efficient by physically hard tasks, fast-paced work, little job control, and commuting. Two of the challenges of working with RA include managing the disease's symptoms and activity limitations in professional tasks. People with RA may also experience difficulties at work due to physically demanding jobs, fast-paced work environments, a lack of job control, and transportation (3). Higher levels of discomfort are associated with higher rates of disease leave and decreased productivity (4).

Syngle et al. (3) observed that 73% of individuals with RA were affected in their work capacity. There was a decrease in working hours in 48% of individuals, 17% left the labour force early and 8% changed their jobs. Of the people who are currently working, 15% are incapacitated in 1 year, 27% in 5 years, and this increases to more than 50% in 10 years (4,5). Many workplace exposures lead to serious financial consequences and increased social security costs for the individual with RA and his/her family. Economically problems experienced may lead to deterioration in the emotional states of individuals, conflicts in the family environment and lead to decreases in health-related quality of life (6-8). Patient health related reports are increasingly being used in clinical studies because they are an important factor in the perception of health and disability status of patients (9). Validity and reliability studies contribute to the quality and credibility of the research as they ensure that the research accurately measures what it is intended to measure and that the results are consistent and reproducible (10).

The arthritis-work spillover (AWS) was developed by Gignac et al. (11) in 2006. It was created to examine the reciprocal effects of work on arthritis in individuals and to evaluate the relationship between demographic, disease and work-related variables and AWS. In the original study all factor loadings were ≥ 0.69 . The factor explains for 62.1% of variance and the alpha value for reliability measurement was 0.88 (11). However, no validity and reliability study has been conducted in another language yet.

To the best knowledge there is no scale translated into Turkish to reciprocal effects of arthritis on work in individuals. The aim of this study was to adapt the AWS to Turkish culture and to examine whether it was valid and reliable.

Methods

The study was approved by the Ethic Committee of the University of Health Sciences Türkiye, Antalya Training and Research Hospital (decision no: 8/6, date: 14.04.2022). The study was conducted between 1 June 2022 and 1 December 2022 in the Internal Medicine Rheumatology Outpatient Clinic of University of Health Science Türkiye, Antalya Training and Research Hospital. Informed consent form was obtained from the individuals who agreed to participate in the study. This study was conducted in accordance with the Declaration of Helsinki.

Translation and Cultural Adaptation

Permission was obtained from Monique Gignac for the Turkish version of the AWS. The Turkish version was created in 5 steps (12).

Translation: The AWS was translated into Turkish by a physiotherapist and a linguist who are native Turkish speakers and fluent in English. These translators created their translations independently of each other.

Synthesis: The first translations were evaluated together by the people who created them and a one translation was created.

Back-translation: The Turkish translation of AWS was translated back into English independently by two linguists who are native English speakers and fluent in Turkish.

Expert committee review: All translations created at this stage were examined by a team consisting of 3 physiotherapists and 2 linguists whose native language is English. After the evaluations, it was decided that the scale was compatible with the original and the pre-final version of the scale was obtained before the pilot study.

Pilot study and creation of final version: The pre-final version of the scale was applied to 20 patients with RA in a pilot study. All participating individuals stated that they had no difficulty in understanding the questions. Thus, the final version of the scale was obtained.

Participants

Sixty individuals aged 18-64 years who were diagnosed with RA by a rheumatologist at the Internal Medicine Rheumatology Outpatient Clinic of University of Health Science Türkiye, Antalya Training and Research Hospital were included in the study. Inclusion criteria were determined as patients with RA for at least 1 year, being employed in a paid job, no comorbidities causing physical disability, being over 18 years old, volunteering to participate in the study and giving consent. Exclusion criteria were determined as patients with hand involvement due to diseases other than a known rheumatological disease, co-morbidities causing physical and cognitive disability, communication problems, illiterate patients and patients not giving consent to participate in the study.

Measures

Participants were asked to complete a demographic form that included age, gender, body mass index, etc. were recorded. Occupation was grouped according to the most recent international standard classification of occupations classification of the international labour organisation. Accordingly, professions are divided into; “professionals, clerical support workers”, “services and sales workers”, “skilled agricultural, forestry and fishery workers”, “craft and related trades workers”, “plant and machine operators and assemblers” and “elementary occupations” (13).

AWS, disabilities of the arm, shoulder and hand questionnaire (DASH) and DASH-work module (DASH-W), arthritis impact measurement scales (AIMS2), disease activity score 28 (DAS28), and Canadian occupational performance measure (COPM) were applied to the individuals whose demographic information was recorded. AWS was re-applied to the individuals 7 days later for test-retest (14,15).

AWS

The AWS was developed by Gignac et al. (11). It is a single-dimensional scale consisting of six items. Six items are designed to assess the extent to which the demands of arthritis affect work performance and the extent to which working life interferes with managing arthritis. The items are scored on a 5-point Likert-type scale (1-strongly disagree, 2-disagree, 3-neither agree or disagree, 4-agree and 5-strongly agree). First three items assess the impact of employment on arthritis. Last three items assess the impact of arthritis on work. In scoring, an average score can be calculated over the six items or a total score can be used. In this study, a total score was obtained (11).

DASH and DASH-W

The DASH evaluates upper extremity symptoms and activities of daily living (16,17). It has a 5-point Likert-type scoring (1-no difficulty, 2-mild difficulty, 3-moderate difficulty, 4-severe difficulty, 5-unable). The DASH questionnaire consists of 30 questions. To calculate the DASH score, the total score is divided by the number of questions answered, subtract one and multiply by twenty-five. In addition to these 30 questions, the optional

DASH-W is created (16,17). The DASH-W assesses the level of disability in working life and consists of 4 questions. For the DASH-W score, the total score is divided by four, subtract one and multiply by twenty-five (16,17).

AIMS2

The AIMS2 scale is a comprehensive and sensitive measure to assess the health status of patients with arthritis (18). In this scale, the last 1 month is questioned. The AIMS2 scale is a 78-item questionnaire and consists of 12 subscales. The results of AIMS2 can be presented in 3 or 5 component models. The 5-component model groups the AIMS2 subscales into the general categories of physical, affect, symptom, social interaction and role. The 3-component model groups the subscales into the general categories of physical, affect and symptom. In AIMS2, specific formulae for each subscale are used for scoring. Higher scores represent poorer health status (18).

DAS28

The DAS28 is an assessment method based on the calculation of swelling and tenderness in 28 joints including proximal interphalangeal joints, metacarpophalangeal joints, wrist, elbow, shoulder and knee joints, together with erythrocyte sedimentation rate (ESR) and patient's global health assessment [visual analogue scale (VAS) 0-100 mm] score, using a special formula (19,20). $DAS28 = [0.56 \times \text{swelling}] + [0.28 \times \text{tenderness}] + [0.70 \times \ln(\text{ESR})] + [0.014 \times \text{VAS for global health}]$. A high score indicates high disease activity: High disease activity: >5.1 ; moderate disease activity: $3.2 < DAS28 \leq 5.1$; low disease activity: ≤ 3.2 ; remission: < 2.6 (19-21).

COPM

The COPM is a measurement created to measure individuals' activity performance and performance satisfaction (22). This measurement is applied with a semi-structured interview method. In the first stage, individuals are asked to determine the activities they do, want to do or have difficulty in their daily lives. Then, they are asked to give these activities an importance score from 1 to 10. The most important 5 activities are selected and they are asked to give a performance score and satisfaction score from 1 to 10 to these activities. Then the performance and satisfaction scores are totalled separately and averaged. As a result, performance and satisfaction scores are obtained (22).

Statistical Analysis

International Business Machines (IBM) Statistical Package for Social Science (SPSS) 25.0 (IBM SPSS Statistics 25.0) was used for data analyses. Jamovi version 2.3.21. was used for confirmatory factor analysis. Demographic and clinical characteristics were expressed as mean $\pm$ standard deviation (SD) or percent (%). For the sample size, based on the validity and internal consistency recommendations of the COSMIN criteria (23,24), it was decided that the number of cases should be 60 individuals with a maximum of 10 times the number of questions. Spearman correlation analysis was performed to examine the relationship between the AWS and the other scales used. Validity was analysed using convergent analysis and confirmatory factor

analysis. For convergent validity, Spearman correlation analyses were performed with DASH-W, AIMS2-role component and COPM. For reliability analysis, internal consistency and test-retest method were applied. Cronbach's alpha coefficient was used for internal consistency analysis. Spearman correlation analysis was used for test-retest. Correlation coefficients: 1.00 to 0.80 very high correlation; 0.80 to 0.60 high correlation; 0.60 to 0.40 moderate correlation; 0.40 to 0.20 low correlation; 0.20 to 0 very low correlation (25,26). Cronbach's alpha coefficient: ≥ 0.90 excellent; 0.90 to 0.80 good; 0.80 to 0.70 acceptable; 0.70 to 0.60 doubtful; 0.60 to 0.50 poor; ≤ 0.50 unacceptable (27). Statistical significance was accepted as $p < 0.05$.

Results

Demographic data and findings of outcome measures are shown in Table 1.

Internal Consistency

Cronbach's alpha was used for internal consistency analysis. Cronbach's alpha coefficient was 0.86. According to these values, the scale had good reliability. It was observed that Cronbach's alpha value decreased when the items were removed from the scale. Based on these results, it was noted that each item in the scale contributed to the Cronbach's alpha value (Table 2).

Test-retest Reliability

Spearman correlation analysis was performed for test-retest and correlation coefficient was found 0.68 ($p < 0.05$) (Table 2).

Confirmatory Factor Analysis

According to confirmatory factor analysis (CFA) results, the goodness of fit indices of the first model was not among desired values. In the CFA, the programme suggested modification between the fourth and sixth items for a better fit of the model. Since the fourth and sixth items consisted of similar expressions, the modification suggestion was applied. After the modifications it was observed that the model showed a good fit with the data [chi-square/degree of freedom (χ^2/sd)=1.0875, root mean square error of approximation (RMSEA)=0.000, standardized root mean square residual (SRMR)=0.041, comparative fit index (CFI)=0.995, Tucker-Lewis index (TLI)=0.992] (Table 3). The path diagram of the AWS after the second CFA model is shown in Figure 1.

Spearman Correlation Analysis

In the convergent validity a moderate positive correlation was found between AWS and DASH-W and AIMS2-role, and a moderate negative correlation was found between COPM-performance and COPM-satisfaction scores ($p < 0.05$, Table 4). A good positive correlation was observed between AWS and AIMS2-symptom component ($p < 0.05$, Table 4). A moderate positive correlation was observed between the scale and DASH, AIMS2-physical, AIMS2-affect measures. DAS28 showed a low positive correlation ($p < 0.05$, Table 4). A low positive correlation was found with AIMS2-social Interaction, but this relationship was not statistically significant ($p > 0.05$, Table 4).

Table 1. Demographic and outcome data of participants

Characteristics (n=60)	
Gender n (%)	
Women/Men	52 (86.7)/8 (13.3)
Education n (%)	
Primary/middle school/high school/university	9 (15)/13 (21.7)/27 (45)/11 (18.3)
Occupation n (%)	
Professionals	7 (11.7)
Clerical support workers	5 (8.3)
Services and sales workers	20 (33.3)
Skilled agricultural, forestry and fishery workers	5 (8.3)
Craft and related trades workers	3 (5)
Plant and machine operators and assemblers	3 (5)
Elementary occupations	17 (28.3)
Additional responsibilities of occupation n (%)	
Overtime/shift work/work travelling	27 (45)/13 (21.7)/2 (3.3)
Age (year), mean $\pm$ SD	51.92 $\pm$ 9.21
Height (cm), mean $\pm$ SD	162.12 $\pm$ 7.68
Weight (kg), mean $\pm$ SD	71.60 $\pm$ 15.35
BMI (kg/m²), mean $\pm$ SD	27.26 $\pm$ 5.85
Durations (year), mean $\pm$ SD	11.28 $\pm$ 7.06
Hours of work per week (h), mean $\pm$ SD	42.82 $\pm$ 4.31
Outcome measures, mean $\pm$ SD	
AWS	20.32 $\pm$ 6.44
DASH	32.18 $\pm$ 19.54
DASH-W	47.60 $\pm$ 26.64
AIMS2-physical	3.01 $\pm$ 5.33
AIMS2-affect	4.00 $\pm$ 1.78
AIMS2-symptom	4.89 $\pm$ 2.29
AIMS2-social interaction	3.08 $\pm$ 1.45
AIMS2-role	3.40 $\pm$ 2.32
DAS28	3.98 $\pm$ 1.39
COPM-performance	4.06 $\pm$ 2.18
COPM-satisfaction	2.92 $\pm$ 2.35
SD: Standard deviation, AWS: Arthritis-work spillover scale, DASH: Disabilities of the arm, shoulder and hand questionnaire, DASH-W: DASH-work module, AIMS2: Arthritis impact measurement scales, DAS28: Disease activity score 28, COPM: Canadian occupational performance measure	

Table 2. Internal consistency analysis Cronbach's alpha results and test-retest reliability of AWS

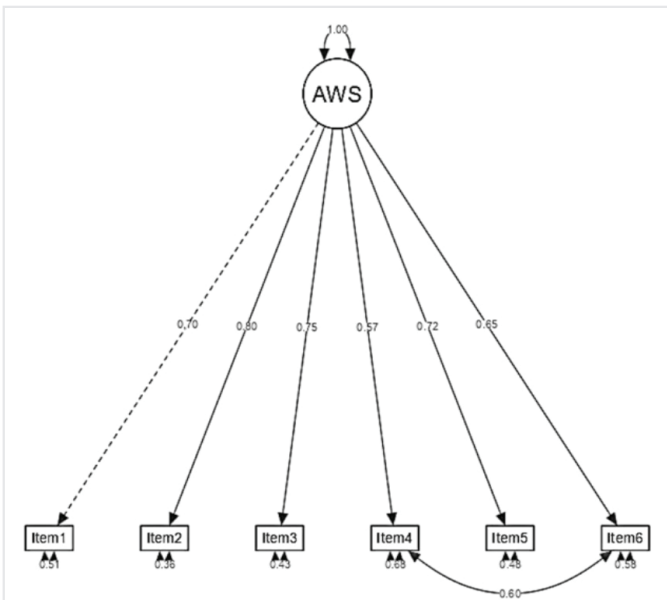
Cronbach's alpha		0.86
Items	Cronbach's alpha if item deleted	r
1- The demands of my job make it difficult for me to take good care of my arthritis.	0.844	0.633
2- It takes a great deal of my energy and time to manage my work demands.	0.835	0.673
3- My condition suffers because of the demands of my work.	0.840	0.646
4- The demands of my arthritis make it difficult for me to do as good a job at my work as I would like.	0.845	0.626
5- It takes a great deal of my energy and time to manage the demands of my condition.	0.836	0.675
6- The quality of my work suffers because of the demands of my arthritis.	0.833	0.688
AWS (second)		
AWS (first)	Correlation coefficient	0.683
	Sig. (2-tailed)	0.000*

*: p<0.05; Spearman correlation analysis, AWS: Arthritis-work spillover scale

Table 3. CFA goodness of fit indices of AWS

	χ^2/sd	RMSEA	SRMR	TLI	CFI
Model 1	3.289	0.169	0.067	0.780	0.868
Model 2	1.0875	0.000	0.041	0.992	0.995

χ^2/sd : Chi-square/degree of freedom, AWS: Arthritis-work spillover scale, RMSEA: Root mean square error of approximation, SRMR: Standardized root mean square residual, TLI: Tucker-Lewis index, CFI: Comparative fit index; Spearman correlation analysis

**Figure 1.** Path diagram of the AWS in confirmatory factor analysis

AWS: Arthritis-work spillover

Discussion

This study examined the validity and reliability of the Turkish cultural adaptation of the AWS scale. According to the results of the study, AWS was found to be valid and reliable.

Table 4. Spearman correlations of AWS with outcomes data

	AWS r_s	p-value
DASH-W	0.528	0.000*
AIMS2-role	0.486	0.000*
COPM-performance	-0.416	0.003*
COPM-satisfaction	-0.435	0.002*
DASH	0.495	0.000*
AIMS2-physical	0.525	0.000*
AIMS2-affect	0.435	0.001*
AIMS2-symptom	0.619	0.000*
AIMS2-social interaction	0.138	0.294
DAS28	0.261	0.044*

*: p<0.05, AWS: Arthritis-work spillover scale, DASH: Disabilities of the arm, shoulder and hand questionnaire, DASH-W: DASH-work module, AIMS2: Arthritis impact measurement scales, DAS28: Disease activity score, COPM: Canadian occupational performance measure

Since the AWS is a Likert-type scale, Cronbach's alpha method was preferred to apply the internal consistency analysis. In the study, the coefficient of the AWS was found to be 0.86 (Table 2) and thus the scale was found to be reliable. In the original study, the alpha coefficient of the scale was found to be 0.88 (11).

The coefficient of the Turkish scale with the original study similarities were detected.

As suggested in the original study (11), we applied test-retest to assess whether the scale was stable and sensitive over time. In test-retest reliability good relationship was found between the two measurements ($r=0.683$; $p=0.000$) (Table 2). This method was not applied while creating the original version of the scale. In the light of the informations obtained, it was determined that the AWS was reliable.

In confirmatory factor analysis RMSEA and SRMR are interpreted between 0 (perfect fit) and 1 (no fit); TLI and CFI are interpreted between 0 (no fit) and 1 (perfect fit) (28-30). In addition χ^2/sd less than 2 indicates excellent fit, RMSEA less than 0.05 indicates excellent fit, SRMR less than 0.08 indicates good fit, CFI and TLI values bigger than 0.90 indicate good fit. The structure that meets these values shows that the model and data are compatible (28-30). In this study the goodness of fit indices of the first model was not among desired values. After the modification of the model good fit was observed with χ^2/sd (1.0875), good with RMSEA value (0.000), good with SRMR value (0.041), good with CFI value (0.995), and good with TLI value (0.992) (Table 3). Based on all these values, it was observed that the model showed a good fit with the data. Confirmatory factor analysis was not applied when the original version of the scale was developed (11).

In the study, DASH-W, AIMS2-rol and COPM measurements were used for convergent validity. DASH-W is used to assess disability in individuals' working life (16,17). The AIMS2-role component also assesses problems experienced in working life (18). The COPM is used to assess the activity performance and satisfaction of individuals (22). The relationship between DASH-W and AWS was positive and moderately significant ($r=0.528$; $p=0.000$) (Table 4). The relationship of the scale with the AIMS2-role component also showed positive moderate significance ($r=0.486$; $p=0.000$) (Table 4). The relationship of AWS with COPM-performance ($r=-0.416$; $p=0.003$) and COPM-satisfaction ($r=-0.435$; $p=0.002$) scores showed negative moderate relationship (Table 4). According to these results, it was seen that the validity of AWS was achieved. Many symptoms of RA such as pain, morning stiffness, swelling and muscle weakness have a direct impact on functional disability and reductions and limitations in physical functions can affect working capacity and make quality of life more fragile (31-33). In addition it was seen that good muscle strength and physical performance led to better job opportunities (31). This study also showed that the relationship between AWS and the physical, affect, symptom and role components of AIMS2, DASH and DASH-W were similar to the literature. The negative correlation with COPM-performance and COPM-satisfaction may explain that AWS scores are negatively affected by losses in physical function.

Studies have shown that work capacity is more affected by functionality than disease activity, and although those with moderate to high levels of disease activity are often associated

with problems in work capacity, a significant proportion of those with active disease do not experience impairment in work capacity (3,34). Various studies have indicated that factors such as economic status, occupational type, medications used, duration of the disease may have significant effects on working capacity other than disease activity (6,35,36). These results may support the weak association of AWS with DAS28 in this study.

The current study did not show a significant relationship between AWS and the social interaction component of AIMS2. In various studies, it has been observed that loss of independence and self-confidence and loss of social skills occur with deterioration in working capacity in individual with RA (37,38). However, it has also been observed that the COVID-19 pandemic in recent years has affected social interactions due to social distance and physical isolation (39). In addition it was stated that the character structures of the individual and the people in their close environment and the support they provide might lead the individual to exhibit more social behaviours (40,41). Based on all this information, it can be considered that many factors other than the disease affect the social interaction of individuals. In order to explain the relationship between AWS and social interaction, studies in which various factors such as disease effect, environmental factors, personality structure or social influence are evaluated together are needed.

The AWS scale may assist clinicians in identifying specific domains of work-related disability, allowing for tailored interventions. It has the advantage of being short and easy to administer.

Study Limitations

Our study had several limitations. The first one was that the number of women was much higher than the number of men. This may have led to gender bias and prevented generalisation of the findings to a wider population. Another limitation was the short duration of the study. Longer studies may help to elucidate the causality of factors affecting work capacity. Another limitation of our study was that we did not assess differences in ethnicity. The diversity of individuals from different geographical regions may have influenced the answers to the questions as they may have different life views (42,43). Another limitation was that individuals were not assessed in terms of their occupation. If the occupation required physical labour or was a desk-based job, it may have had a positive or negative effect on the answers given by the individuals, depending on the situation. As this was a cross-sectional study, the responsiveness or sensitivity to change overtime of the AWS was not evaluated. Future studies with AWS should be planned according to ethnicity and work performed, and studies comparing gender differences should be conducted.

Conclusion

The AWS scale was found to be a valid and reliable scale for assessing work affect in individuals with RA. It is also advantageous that the scale can be applied in a short time. The AWS scale should be used in clinics by clinicians such as physiotherapists, physicians, occupational therapists and psychologists etc. to determine the

problems experienced by patients in their professional lives and can also be a guide in planning work and occupational programmes of patients.

Ethics

Ethics Committee Approval: The study was approved by the Ethic Committee of the University of Health Sciences Türkiye, Antalya Training and Research Hospital (decision no: 8/6, date: 14.04.2022).

Informed Consent: Informed consent form was obtained from the individuals who agreed to participate in the study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.A., Concept: S.Y.Ç., A.A., Design: S.Y.Ç., Data Collection or Processing: D.S.K., Analysis or Interpretation: S.Y.Ç., Literature Search: D.S.K., Writing: D.S.K.

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References

1. Wong J, Kallish N, Crown D, Capraro P, Trierweiler R, Wafford QE, et al. Job accommodations, return to work and job retention of people with physical disabilities: a systematic review. *J Occup Rehabil*. 2021;31:474-90.
2. Gignac MAM, Ibrahim S, Smith PM, Kristman V, Beaton DE, Mustard CA. The role of sex, gender, health factors, and job context in workplace accommodation use among men and women with arthritis. *Ann Work Expo Health*. 2018;62:490-504.
3. Syngle D, Singh A, Verma A. Impact of rheumatoid arthritis on work capacity impairment and its predictors. *Clin Rheumatol*. 2020;39:1101-9.
4. Young A, Dixey J, Cox N, Davies P, Devlin J, Emery P, et al. How does functional disability in early rheumatoid arthritis (RA) affect patients and their lives? Results of 5 years of follow-up in 732 patients from the Early RA Study (ERAS). *Rheumatology (Oxford)*. 2000;39:603-11.
5. Hammond A. What is the role of the occupational therapist? *Best Pract Res Clin Rheumatol*. 2004;18:491-505.
6. Gignac MA, Lacaille D, Beaton DE, Backman CL, Cao X, Badley EM. Striking a balance: work-health-personal life conflict in women and men with arthritis and its association with work outcomes. *J Occup Rehabil*. 2014;24:573-84.
7. Prędkiewicz P, Bem A, Siedlecki R, Kowalska M, Robakowska M. An impact of economic slowdown on health. New evidence from 21 European countries. *BMC Public Health*. 2022;22:1405.
8. Verstappen SMM. The impact of socio-economic status in rheumatoid arthritis. *Rheumatology (Oxford)*. 2017;56:1051-2.
9. Bourgeois FT, Porter SC, Valim C, Jackson T, Cook EF, Mandl KD. The value of patient self-report for disease surveillance. *J Am Med Inform Assoc*. 2007;14:765-71.
10. Mnguni L. Strategies for the development and application of research frameworks in sciences education research. *Journal of Educational and Social Research*. 2021;11:1-9.
11. Gignac MA, Sutton D, Badley EM. Reexamining the arthritis-employment interface: perceptions of arthritis-work spillover among employed adults. *Arthritis Rheum*. 2006;55:233-40.
12. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)*. 2000;25:3186-91.
13. International Labour Organization. International Standard Classification of Occupations - 2008 (ISCO-08): Structure and index correspondence with ISCO-88. Geneva: ILO; 2016 [available from: <https://www.ilo.org/public/english/bureau/stat/isco/isco08/>].
14. Bakar Y, Tuğral A, Özdemir Ö, Duygu E, Üyetürk Ü. Translation and validation of the Turkish version of lymphedema quality of life tool (LYMQOL) in patients with breast cancer related lymphedema. *Eur J Breast Health*. 2017;13:123-8.
15. Felsch QTM, Sievert P, Schotanus MGM, Jansen EJP. The Dutch version of the American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form is a reliable and valid questionnaire for shoulder problems. *JSES Open Access*. 2019;3:213-8.
16. Dürger T, Yakut E, Öksüz Ç, Yörükcan S, Bilgütay BS, Ayhan Ç, et al. Reliability and validity of the Turkish version of the Disabilities of the Arm, Shoulder and Hand (DASH) Questionnaire. *Fizyoter Rehabil*. 2006;17:99-107.
17. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand) [corrected]. The upper extremity collaborative group (UECG). *Am J Ind Med*. 1996;29:602-8. Erratum in: *Am J Ind Med* 1996;30:372.
18. Meenan RF, Mason JH, Anderson JJ, Guccione AA, Kazis LE. AIMS2. The content and properties of a revised and expanded arthritis impact measurement scales health status questionnaire. *Arthritis Rheum*. 1992;35:1-10.
19. Fransen J, van Riel PL. The disease activity score and the EULAR response criteria. *Clin Exp Rheumatol*. 2005;23(5 Suppl 39):S93-9.
20. van Riel PL, Renskers L. The disease activity score (DAS) and the disease activity score using 28 joint counts (DAS28) in the management of rheumatoid arthritis. *Clin Exp Rheumatol*. 2016;34:S40-4.
21. van Gestel AM, Haagsma CJ, van Riel PL. Validation of rheumatoid arthritis improvement criteria that include simplified joint counts. *Arthritis Rheum*. 1998;41:1845-50.
22. Law M, Baptiste S, McColl M, Opzoomer A, Polatajko H, Pollock N. The Canadian occupational performance measure: an outcome measure for occupational therapy. *Can J Occup Ther*. 1990;57:82-7.
23. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. *Qual Life Res*. 2010;19:539-49.

24. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, Bouter LM, de Vet HC. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *J Clin Epidemiol.* 2010;63:737-45.
25. Duman G, Ozkur F. Analyzing the embedded learning-based movement education program's effects on preschool children's visual-motor coordination and self-regulation. *JEL.* 2019;8:193-202.
26. Wang C-N, Le T-M, Nguyen H-K, Ngoc-Nguyen H. Using the optimization algorithm to evaluate the energetic industry: a case study in Thailand. *Processes.* 2019;7:87.
27. Gliem JA, Gliem RR. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Presented at: Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education; Columbus (OH). 2003;82-8.
28. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling.* 1999;6:1-55.
29. Schumacker RE, Lomax RG. A beginner's guide to structural equation modeling. 3rd ed. New York: Routledge; 2010.
30. Tabachnick BG, Fidell LS. Using multivariate statistics. 4th ed. Boston (MA): Allyn & Bacon; 2001.
31. Berner C, Erlacher L, Quittan M, Fenzl KH, Dorner TE. Workability and muscle strength in patients with seropositive rheumatoid arthritis: survey study protocol. *JMIR Res Protoc.* 2017;6:e36.
32. Mattila K, Buttgereit F, Tuominen R. Impact of morning stiffness on working behaviour and performance in people with rheumatoid arthritis. *Rheumatol Int.* 2014;34:1751-8.
33. Verstappen SM, Bijlsma JW, Verkleij H, Buskens E, Blaauw AA, ter Borg EJ, et al; Utrecht Rheumatoid Arthritis Cohort Study Group. Overview of work disability in rheumatoid arthritis patients as observed in cross-sectional and longitudinal surveys. *Arthritis Rheum.* 2004;51:488-97.
34. Macedo A, Oakley S, Gullick N, Kirkham B. An examination of work instability, functional impairment, and disease activity in employed patients with rheumatoid arthritis. *J Rheumatol.* 2009;36:225-30.
35. Berner C, Haider S, Grabovac I, Lamprecht T, Fenzl KH, Erlacher L, et al. Work ability and employment in rheumatoid arthritis: a cross-sectional study on the role of muscle strength and lower extremity function. *Int J Rheumatol.* 2018;2018:3756207.
36. González-Alvaro I, Descalzo MA, Carmona L; Estudio de la Morbilidad y Expresión Clínica de la Artritis Reumatoide Study Group. Trends towards an improved disease state in rheumatoid arthritis over time: influence of new therapies and changes in management approach: analysis of the EMECAR cohort. *Arthritis Res Ther.* 2008;10:R138.
37. Bay LT, Ellingsen T, Giralaldi A, Graugaard C, Nielsen DS. "To be lonely in your own loneliness": the interplay between self-perceived loneliness and rheumatoid arthritis in everyday life: a qualitative study. *Musculoskeletal Care.* 2020;18:450-8.
38. Swärdh E, Opava C, Brodin N. Physical activity in patients with rheumatoid arthritis - an agile lifelong behaviour: a qualitative meta-synthesis. *RMD Open.* 2021;7:e001635.
39. Howren A, Avina-Zubieta JA, Puyat JH, Da Costa D, Xie H, Davidson E, et al. Impact of loneliness and social isolation on mental health outcomes among individuals with rheumatic diseases during the COVID-19 pandemic. *ACR Open Rheumatol.* 2023;5:243-50.
40. Breil SM, Geukes K, Wilson RE, Nestler S, Vazire S, Back MD. Zooming into real-life extraversion - how personality and situation shape sociability in social interactions. *Collabra: Psychology.* 2019;5:7.
41. Sherman RA, Rauthmann JF, Brown NA, Serfass DG, Jones AB. The independent effects of personality and situations on real-time expressions of behavior and emotion. *J Pers Soc Psychol.* 2015;109:872-88.
42. Blair IV, Steiner JF, Fairclough DL, Hanratty R, Price DW, Hirsh HK, et al. Clinicians' implicit ethnic/racial bias and perceptions of care among Black and Latino patients. *Ann Fam Med.* 2013;11:43-52.
43. Sui J, Hong YY, Hong Liu C, Humphreys GW, Han S. Dynamic cultural modulation of neural responses to one's own and friend's faces. *Soc Cogn Affect Neurosci.* 2013;8:326-32.