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Original Article

Is it possible to develop a new measurement tool to assess the functional status in patients with rheumatoid arthritis?

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ABSTRACT

Objectives: This study aims to develop measurement tools for assessing patients' functional status with rheumatoid arthritis (RA) in terms of upper and lower extremity function and to evaluate the tools' construct validities with classical and modern psychometric approaches.

Patients and methods: Between April 2010 and April 2012, a total of 300 patients with RA (77 males, 223 females; mean age: 52.3±11.5 years; range, 18 to 82 years) who answered items from a range of widely used instruments were included. After examining initial dimensionality with exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and Rasch analysis were used to evaluate the tools' construct validities. The data-model fit was evaluated with goodness-of-fit (GoF) statistics in CFA, while the tools were examined in terms of item and person fit, unidimensionality and differential item functioning (DIF) from the perspective of Rasch analysis.

Results: According to EFA, two dimensions were identified and named as "self-care-mobility-household activities related to lower extremity" and "self-care-mobility-household activities related to upper extremity" taking into account the factor loadings and the clinical classifications. While the clinical classification was tested with CFA, all items were loaded on their pre-defined dimensions with the factor loadings of ≥0.40 and GoF statistics were within the acceptable ranges. When the "self-care-mobility-household activities related to upper extremity" and "self-care-mobility-household activities related to lower extremity" tools were evaluated via the Rasch analysis, both tools were found to fit the Rasch model expectations, with a mean item fit statistics of -0.528 logit (standard deviation [SD]: 1.365) and -0.213 (SD: 1.168; mean person fit statistics of -0.412 logit (SD: 1.160) and -0.303 logit (SD: 0.859), respectively.

Conclusion: For the evaluation of a scale's construct validity, it is recommended to use the Rasch analysis in tandem with factor analytic methods, as the Rasch analysis explores a scale's construct validity in terms of item and person fit, DIF and unidimensionality which is the only aspect of the factor analysis.

Keywords: Factor analysis, functional status, measurement tool, Rasch analysis, rheumatoid arthritis.

Rheumatoid arthritis (RA) is a chronic, systemic, inflammatory disease characterized by inflammatory polyarthritis. Outcome assessment in RA is fairly complex such as in other chronic diseases. The main areas of outcomes are joint damage, disease activity, and functional status. Each of these areas consisting of different domains can be assessed with various instruments. Functional status is an important outcome in patients with RA and refers to measures of functioning that capture the interaction between a person's health status and the ability to participate in activities.[1] Functioning is usually evaluated with patient-reported questionnaires.[2] A large number of outcome measures, such as the Health Assessment Questionnaire (HAQ), Arthritis Impact Measurement Scale-2 (AIMS2), and Short Form-36 (SF-36) are available to assess functioning in patients with RA. The HAQ is the most widely used patient reported outcome

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measure to assess functional status in RA. The HAQ comprises 20 questions on activities involving both upper and lower extremities that are organized into eight categories (i.e., dressing, rising, eating, walking, hygiene, reach, grip, and usual activities).[3]

Although the classic clinical presentation of RA is a symmetric small joint synovitis of the hands and feet, involvement of the larger joints such as knees and elbows is common. In clinical practice, the evaluation of upper and lower limb function separately may be needed in some cases. Functional assessment instruments used in RA usually assess general functioning, without focusing on the upper or lower extremity activities.[4]

Factor analysis is a multivariate statistical analysis method which aims to find fewer meaningful and independent variables from a set of dependent variables that are related to each other.[5] The aim of factor analysis in scale development is to show whether the items in the scale measure the actual structure investigated. Rasch analysis is a widely used method in the scale development process, which examines whether the current dataset complies with the measurement model developed by Georg Rasch[6] and to what extent it meets the criteria required for a successful measurement.

In the present study, we aimed to develop measurement tools to assess functional status of patients with RA in terms of upper and lower extremity functions separately and to evaluate of the tools' construct validities with classical (factor analysis) and modern (Rasch analysis) psychometric approaches.

PATIENTS AND METHODS

This methodological study was conducted at Ankara University Faculty of Medicine and Ankara Numune Training and Research Hospital, Department of Physical Medicine and Rehabilitation between April 2010 and April 2012. In this study, data obtained from 300 RA patients (77 males, 223 females; mean age: 52.3±11.5 years; range, 18 to 82 years) within the scope of a previously conducted TÜBİTAK project were used (Disability Assessment with Computer Adaptive Test Method in Patients with Rheumatoid Arthritis. TÜBİTAK 1001 Research Projects, 109S342, 2010-2012).[7] A written informed consent was obtained from each patient. The study protocol was approved by the Ethics Committee of the Faculty of Ankara University (Date/no: April 07, 2008/127-3559). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Outcome measures

In the previously conducted project, 300 patients with RA answered items from a range of widely used instruments: World Health Organization-Disability Assessment Schedule II (WHODAS-II),[8] Nottingham Health Profile (NHP),[9] HAQ,[3] and AIMS2.[10] Validated Turkish versions of the scales were used.[11-14] Among the all scales, 32 items specific to "self-care-mobility-household activities" for only lower and for only upper extremities were selected for this study.

Internal construct validity

Within the scope of this study, the construct validities of the measurement tools were evaluated by both factor analytic methods and Rasch analysis.

Factor analysis

Factor analysis is a multivariate statistical analysis method which aims to find fewer meaningful and independent variables from a set of dependent variables that are related to each other. Factor analysis is examined according to the purpose of analysis as exploratory or confirmatory factor analysis (CFA). Exploratory factor analysis (EFA) is a statistical method used to determine the number of latent factors to be formed from the item set without any prior knowledge.[15] In CFA, it is evaluated whether the items constitute the pre-defined dimensions in the light of prior knowledge.

As the first stage, the internal construct validity of the measurement tool was evaluated with EFA in the categorical data. The conventional factor analysis is not appropriate for use in the analysis of categorical data, since it is based on the principal component analysis and determines more dimensions than it actually has. Therefore, a robust weighted least squares method based on polychoric/tetrachoric correlations and the Geomin rotation method were used to analyze data.[15] When more than one dimension was found in the EFA, the measurement tool(s) were created separately for these dimensions. While creating the measurement tools, the clinical classifications of the items were taken into consideration and obtained dimensions were named by considering these classifications. Items, that did not load to any dimension (factor loading in each dimension <0.40), were excluded from the study.

As the second stage, the internal construct validities of the measurement tools were evaluated with CFA in the categorical data. In this stage, it was investigated whether the factors obtained from clinical classification were able to explain the covariance structure of the items. Similar to EFA, items, that did not load to any dimension (factor loading in each dimension <0.40), were excluded from the study.

While evaluating the psychometric properties of the measurement tools found in EFA and CFA, goodness-of-fit (GoF) statistics were used. With the GoF statistics, it is decided whether the factors actually consist of these items. The most commonly used GoF statistics are the Goodness-of-Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMSR), and the Weighted Root Mean Residuals (WRMR). The values for the first four greater than 0.90/0.95 are considered acceptable/good fit. For the last three, values below 0.05/0.08 are considered good/acceptable fit.[15] The GoF statistics used in the study were CFI, TLI, and RMSEA.

A trial version of the MPlus 6.1 (Muthén & Muthén, CA, USA)[16] was used for EFA and CFA.

Rasch analysis

The Rasch analysis is a widely used method in scale development process, which examines whether the current data set complies with the measurement model developed by Rasch[6] and to what extent it meets the criteria required for a successful measurement. It assists the correct evaluation of the individuals by providing the transformation of the answers obtained with ordinal scale to the interval variable in case the Rasch model meets the expectations.[6,17]

Although RM was originally developed for dichotomous items, it has models that can be used for polytomous items. They are the partial credit model (PCM) and the rating scale model (RSM).

For Rasch analysis, the following standard protocol must be met.[15]

- Testing the internal consistency of the measurement tool for unidimensionality
- Examination of the compatibility of the items in the measurement tool with the model
- Testing whether the items provide invariance
- Testing whether the thresholds are ordered (For polytomous items)
- Testing of differential item functioning (DIF)

In the scope of this study, PCM was used for examination of measurement tools. At the end of this analysis, items that do not comply with the model, show DIF in terms of age, sex, and/or disease duration and disrupt the unidimensionality assumption were excluded from the measurement tools. The age variable was divided into four categories according to the quartiles (≤43, 44-52, 53-60, ≥61 years), while disease duration was divided into two categories (≤10, >10 years), according to the median. The RUMM version 2020 program was used for the Rasch analysis.[18]

RESULTS

The mean disease duration was 11.3±8.0 years (range, 4 months to 44 years). In the scope of study, the items used for developing the measurement tools are presented in Table 1 in terms of extremity (only lower, only upper).

Exploratory factor analysis results

In the first stage, the EFA was applied to evaluate the internal construct validity of the measurement tool consisting of 32 items. As a result, the RMSEA value for the two-factor model was 0.078 and this value is very close to the acceptable limit of 0.08 for adequate fit. Considering the factor loadings and clinical classifications of the items, the first dimension was named as “self-care-mobility-household activities related to lower extremity” and the second dimension was named as “self-care-mobility-household activities related to upper extremity” (Table 2).

When Table 2 was examined, although the h2, h15, and h17 items were loaded with a factor loading of more than 0.40 in both dimensions, they were evaluated in the factor with higher factor loading. This evaluation is consistent with the clinical classification. Although h13 item also loaded with salient loadings on both dimensions, the group with a higher factor loading was incompatible with the clinical classification. When the content of this item was examined in detail, it was concluded that patients may have responded by considering the effect of lower extremity in the process of grasping and lowering the object. Therefore, also considering the opinion of the clinician, h13 was associated with the upper extremity.

According to the results of EFA, the factor loadings of the items in the “self-care-mobility-household activities related to the lower extremity” factor were between 0.444 and 0.937, while the factor loadings of the items in the “self-care-mobility-house household

TABLE 1
Distribution of items by extremities

Abbreviation	Item	Original scale section	Extremity
WD2.1	In the past 30 days, how much difficulty did you have in standing for long periods such as 30 minutes?	Getting around	Lower
WD2.2	In the past 30 days, how much difficulty did you have in standing up from sitting down?	Getting around	Lower
WD2.3	In the past 30 days, how much difficulty did you have in moving around inside your home?	Getting around	Lower
WD2.4	In the past 30 days, how much difficulty did you have in getting out of your home?	Getting around	Lower
WD2.5	In the past 30 days, how much difficulty did you have in walking a long distance such as a kilometer [or equivalent]?	Getting around	Lower
WD3.3	In the past 30 days, how much difficulty did you have in eating?	Self-care	Upper
WD4.5	In the past 30 days, how much difficulty did you have in sexual activities?	Getting along with people	Lower
A11	During the past month, could you easily write with a pen or pencil?	Hand and finger function	Upper
A12	During the past month, could you easily button a shirt or blouse?	Hand and finger function	Upper
A13	During the past month, could you easily turn a key in a lock?	Hand and finger function	Upper
A14	During the past month, could you easily tie a knot or a bow?	Hand and finger function	Upper
A15	During the past month, could you easily open a new jar of food?	Hand and finger function	Upper
N10	I can walk about only indoors	Physical abilities	Lower
N11	I find it hard to bend	Physical abilities	Lower
N14	I'm unable to walk at all	Physical abilities	Lower
N17	I have trouble getting up and down stairs and steps	Physical abilities	Lower
N27	I find it hard to stand for long (e.g., at the kitchen sink, waiting in a line)	Physical abilities	Lower
N35	I need help to walk about outside (e.g., a walking aid or someone to support me)	Physical abilities	Lower
H2	Over the past week, are you able to shampoo your hair?	Dressing & grooming	Upper
H3	Over the past week, are you able to stand up from a straight chair?	Arising	Lower
H4	Over the past week, are you able to get in and out of bed?	Arising	Lower
H5	Over the past week, are you able to cut your meat?	Eating	Upper
H6	Over the past week, are you able to lift a full cup or glass to your mouth?	Eating	Upper
H7	Over the past week, are you able to open a new milk carton?	Eating	Upper
H8	Over the past week, are you able to walk outdoors on flat ground?	Walking	Lower
H9	Over the past week, are you able to climb up five steps?	Walking	Lower
H12	Over the past week, are you able to get on and off the toilet?	Hygiene	Lower
H13	Over the past week, are you able to reach and get down a 5-pound object (such as a bag of sugar) from just above your head?	Reach	Upper
H15	Over the past week, are you able to open car doors?	Grip	Upper
H16	Over the past week, are you able to open jars which have been previously opened?	Grip	Upper
H17	Over the past week, are you able to turn faucets on and off?	Grip	Upper
H19	Over the past week, are you able to get in and out of a car?	Activities	Lower

WD: Whodas-II; A: AIMS2; N: NHP; H: HAQ.

TABLE 2
Results of exploratory factor analysis (EFA)

Abbreviation	F1	F2	Extremity	Abbreviation	F1	F2	Extremity
WD2.1	0.895	-0.149	Lower	N27	0.937	-0.329	Lower
WD2.2	0.772	-0.014	Lower	N35	0.909	0.019	Lower
WD2.3	0.853	-0.033	Lower	H2	0.446	0.561	Upper
WD2.4	0.881	-0.056	Lower	H3	0.912	0.100	Lower
WD2.5	0.848	-0.069	Lower	H4	0.915	0.085	Lower
WD3.3	0.369	0.533	Upper	H5	0.368	0.641	Upper
WD4.5	0.549	0.100	Lower	H6	0.306	0.655	Upper
AIMS11	-0.004	0.911	Upper	H7	0.366	0.627	Upper
AIMS12	-0.026	0.960	Upper	H8	0.925	0.007	Lower
AIMS13	0.044	0.907	Upper	H9	0.801	0.151	Lower
AIMS14	-0.085	0.996	Upper	H12	0.658	0.243	Lower
AIMS15	0.141	0.718	Upper	H13	0.532	0.454	Upper
N10	0.813	0.019	Lower	H15	0.503	0.543	Upper
N11	0.759	0.006	Lower	H16	0.381	0.603	Upper
N14	0.568	0.124	Lower	H17	0.444	0.542	Upper
N17	0.907	-0.170	Lower	H19	0.613	0.344	Lower

WD: Whodas-II; A: AIMS2; N: NHP; H: HAQ; As a result of EFA, F1 was named as “Self-care-mobility-household activities related to the lower extremity”, F2 was named “Self-care-mobility- household activities related to upper extremity”.

TABLE 3
Results of confirmatory factor analysis (CFA)

	Abbreviation	F.L.	SE	F.L./SE	*p*		Abbreviation	F.L.	SE	F.L./SE	*p*
Self care-mobility-household activities related to the lower extremity	WD2.1	0.779	0.028	28.23	<0.001	Self care-mobility-household activities related to the upper extremity	H12	0.847	0.026	32.33	<0.001
	WD2.2	0.753	0.031	24.34	<0.001		H19	0.910	0.023	40.35	<0.001
	WD2.3	0.816	0.027	30.64	<0.001		WD3.3	0.814	0.035	23.11	<0.001
	WD2.4	0.839	0.023	36.16	<0.001		A11	0.877	0.018	47.45	<0.001
	WD2.5	0.795	0.027	29.74	<0.001		A12	0.914	0.015	60.95	<0.001
	WD4.5	0.624	0.052	11.95	<0.001		A13	0.909	0.016	55.63	<0.001
	N10	0.820	0.039	20.91	<0.001		A14	0.891	0.014	63.36	<0.001
	N11	0.759	0.040	18.89	<0.001		A15	0.774	0.027	29.02	<0.001
	N14	0.661	0.090	7.35	<0.001		H2	0.906	0.016	57.03	<0.001
	N17	0.775	0.041	18.81	<0.001		H5	0.907	0.016	57.29	<0.001
	N27	0.707	0.044	16.10	<0.001		H6	0.866	0.022	39.01	<0.001
	N35	0.913	0.021	43.13	<0.001		H7	0.892	0.017	51.96	<0.001
	H3	0.979	0.009	108.24	<0.001		H13	0.893	0.017	53.07	<0.001
	H4	0.966	0.010	99.25	<0.001		H15	0.952	0.015	62.98	<0.001
	H8	0.917	0.017	54.89	<0.001		H16	0.884	0.018	48.29	<0.001
	H9	0.911	0.018	51.78	<0.001		H17	0.888	0.019	45.74	<0.001

F.L.: Factor loading; SE: Standard error; WD: Whodas-II; A: AIMS2; N: NHP; H: HAQ.

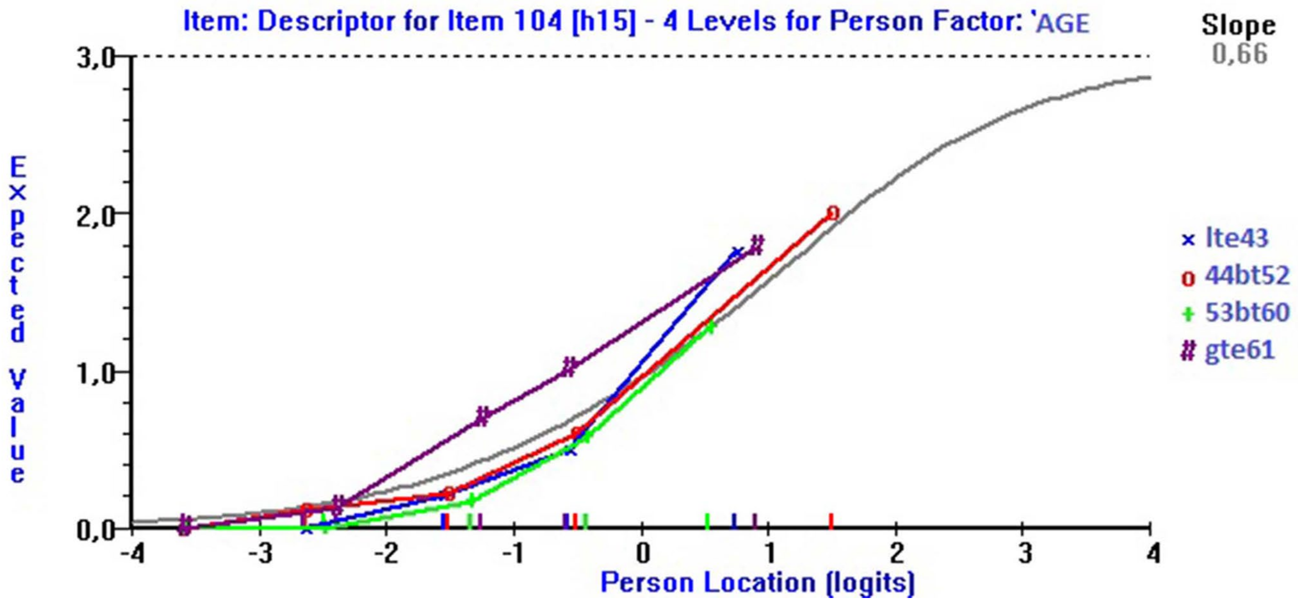

Figure 1. Item characteristic curves of the item "h15-open car doors?" according to age groups.

activities related to the upper extremity" factor were between 0.454 and 0.996.

Confirmatory factor analysis results

The CFA was applied to determine whether the upper and lower extremity factors in the Table 1 (separately) were actually composed of relevant items. As a result of the CFA, the RMSEA value was 0.085, the CFI value was 0.958 and the TLI value was 0.954. As the first value was close to 0.08 and the other values were greater than 0.90, the results obtained from CFA were evaluated as satisfactory. When the factor loadings of the items were examined according to the factors, all items had a factor loading of ≥0.40 in the relevant dimensions (Table 3).

Rasch analysis results

At this stage, the internal construct validity of the measurement tool was investigated with a total of 32 items by ignoring the clinical structure given in Table 1 and by the PCM under Rasch analysis. After combining the categories of items with disordered thresholds, unidimensionality was examined as the first step. It was observed that the structure of unidimensionality was not provided. Thus, the similarity of the dimensions obtained from the positive and negative loaded items on the first principal component was compared with the clinical structure. The 14 items identified within the clinical structure for the upper extremity corresponded to the item set positively loaded in the 32-item Rasch analysis. Of the 18 items identified in the clinical structure for the lower extremity, 16 of the 32 items in the Rasch analysis corresponded to a set of items that were negatively loaded. As a result of Rasch analysis, the remaining two items were not loaded to any group.

Rasch analysis of the measurement tool "self-Care-mobility-household activities related to the upper extremity"

After combining the categories of items with disordered thresholds, the model fit of the 14 items were examined. Following this, the unidimensionality of the measurement tool was tested. As items A14, H7 and H13 violated the unidimensionality assumption, those items were removed. Local independence assumption was also hold. When DIF was evaluated both graphically and statistically, only the item "h15- Open car doors?" showed uniform DIF according to the age group (Figure 1).

As shown in Figure 1, opening car doors was found to be more difficult for patients over 61 years old. As this item was considered necessary to question the level of functionality related to the patient's self-care, it was kept in the measurement tool.

There was no item showing misfit, as assessed by the Bonferroni correction (Table 4). Since the residual values were between ±2.5 and the chi-square (χ^2) values are higher than the value of p value

TABLE 4
Item fit statistics of "self-care-mobility-household activities related to the upper extremity" measurement tool

Abbreviation	Beta	SE	Residual	Chi-square	*p*
WD3.3	1.390	0.137	1.665	13.303	0.010
A11	-0.520	0.124	-0.315	5.210	0.266
A12	-0.139	0.129	-1.161	4.824	0.306
A13	-0.327	0.125	-1.053	4.364	0.359
A15	-2.050	0.125	1.914	10.257	0.036
H2	-0.306	0.107	0.105	1.042	0.903
H5	-0.393	0.106	-1.303	5.157	0.272
H6	1.163	0.130	-1.780	3.870	0.424
H15	0.795	0.125	-2.199	6.670	0.154
H16	-0.374	0.104	0.046	2.941	0.568
H17	0.762	0.122	-1.730	4.281	0.369

SE: Standard error; WD: Whodas-II; A: AIMS2; H: HAQ.

with Bonferroni correction (0.05/11=0.005), all items in the measurement tool fitted to the model (Table 4). Overall mean item fit residual was -0.528 logit (SD 1.365) and mean person fit residual was -0.412 logit (SD 1.160). Item-trait interaction was non-significant, supporting the invariance of items (χ^2: 61.92, p=0.039).

Rasch analysis of the measurement tool "self-care-mobility-household activities related to the lower extremity"

After combining the categories of items with disordered thresholds, the model fit of the 16 items were examined. As the items WD2.1, WD4.5, H3, H8, and N35 showed misfit to the model, these items were removed. When the unidimensionality, local independence assumptions and existence of DIF were evaluated, both assumptions were hold and there were no items showing DIF.

There was no item showing misfit, as assessed by the Bonferroni correction (Table 5). Since the residual values are between ±2.5 and χ^2 values are higher than the value of p value with Bonferroni correction (0.05/11=0.005), all items in the measurement tool fitted to the model (Table 5). Overall mean item fit

TABLE 5
Item fit statistics of "self-care-mobility-household activities related to the lower extremity" measurement tool

Abbreviation	Beta	SE	Residual	Chi-square	*p*
WD2.2	0.919	0.117	0.344	4.447	0.349
WD2.3	1.655	0.124	-2.306	7.253	0.123
WD2.4	0.024	0.080	-0.462	6.155	0.188
WD2.5	-1.908	0.112	0.356	0.539	0.970
N10	0.984	0.185	-0.608	6.239	0.182
N11	-1.061	0.154	0.149	3.758	0.440
N17	-2.350	0.163	0.555	7.623	0.106
N27	-3.703	0.199	0.200	1.035	0.904
H4	2.541	0.137	-2.139	7.761	0.101
H9	1.412	0.114	-0.496	3.791	0.435
H12	1.486	0.117	0.857	5.971	0.201

SE: Standard error; WD: Whodas-II; A: AIMS2; H: HAQ.

residual was -0.323 logit (SD 1.045) and mean person fit residual was -0.305 logit (SD 0.768). Item-trait interaction was non-significant, supporting the invariance of items (χ^2: 54.57, p=0.132).

When a comparison was made between the "self-care-mobility-household activities related to the lower extremity" measurement tools obtained by the clinical structure and factor analysis and obtained by the Rasch analysis, 11 items were common. With the exception of two additional items (WD4.5 and H19), there was no significant difference between the psychometric properties of the measurement tools. Therefore, when clinicians decide between these two measurement tools for examining the "self-care-mobility-household activities related to the lower extremity", it would be appropriate for taking into account the contribution of WD4.5 and H19.

DISCUSSION

In evaluating the internal construct validity, which is probably the most important type of validity in scale development, EFA and CFA from the factor analytic approaches and Rasch analysis from modern approaches are among the most widely used methods.

Within the scope of this study, two measurement tools that evaluate the functional levels for lower and upper extremities separately in patients with RA in terms of "self-care-mobility-household activities" were developed. Internal construct validity of the tools was evaluated by both factor analysis (EFA and CFA) and Rasch analysis. When the total 32 items were evaluated by EFA, the model fit of the two-factor structure was adequate. Except for one item, all items were loaded on the factors in accordance with the clinical structure. In the second stage, CFA was applied to determine whether the upper and lower extremity structures identified as clinically were actually composed of related items. Considering the GoF statistics, satisfactory results were achieved.

Based on the Rasch analysis, items that did not fit to the model showed DIF and violated the unidimensionality assumption were excluded from the measurement tool. While choosing between these two measurement tools developed for lower extremity, it is appropriate for clinicians to consider the contribution of the items that question sexual life and the activity of getting in and out of the car in the light of additional information.

The discrepancy in the results of factor analysis and Rasch analysis is an expected situation considering the differences in the process of the methods. Review of the literature reveals that some of the studies carried out in the field of scale development are evaluated only with factor analysis/Rasch analysis and some others with both methods.[19,20] The common factor analysis (EFA and CFA) creates independent, conceptually significant factors that represent the related structure from dependent items. With this structure, factor analysis is a multivariate analysis method that is basically performed with the aim of data reduction. In view of the modern test theory, Rasch analysis evaluates whether there are any items showing disordered thresholds, misfit, and DIF in addition to the dimensionality of the items in the measurement tool. In the light of this information, when the factor analysis and Rasch analysis are compared, Rasch analysis can be said to have a structure that includes factor analysis. However, according to the literature review in the fields of "psychometry" and "measurement and evaluation", factor analytic approaches were frequently used in the years, when classical test theory was developed and, in parallel with the developments in technology, modern test theories have emerged and methods such as Rasch analysis have become increasingly more popular.

In conclusion, from these two methods that have similarities in terms of their functioning, factor analysis methods can be applied to the evaluation of prior unidimensionality before unidimensionality examination to be performed within the scope of the Rasch analysis. As a different field of use, the measurement tools revealing the internal construct validity as a result of the Rasch analysis can be verified by the CFAs to be performed on different data sets. Based on these findings, we consider that the reliability of the results obtained from the use of these two complementary approaches is more important than the application of factor analysis or Rasch analysis methods alone, in the examination of the newly developed scales in the field of health or the validity of internal construct of the existing scales to be adapted for different languages/cultures/groups.

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