



Reliability and Validity of the Turkish Version of the Caregiver Reaction Assessment Scale

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ABSTRACT The scales need to be adapted for the society so that they can be used. This study aims to assess the reliability and validity of the Caregiver Reaction Assessment Scale. The phases of the testing of the scale included the translation and adaptation of the Preparedness for Caregiving Scale construct analysis by an expert group, and pre-test and psychometric evaluation (factor analysis, reliability coefficient and inter-item correlations). Pearson Correlation analysis of the results showed a significant positive relationship between test-retest scores of the scale ($r = .775$, $p = .000$; $t = 781$, $p = .439$). Cronbach alpha coefficient was $\alpha = .88$ and standardized α value was $.89$. The scale explains the fifty-six percent of total variance. The scales were found to be reliable and valid in Turkish population. These findings suggest that the Turkish version of the instrument is available for measuring specific aspects of the caregiving experience in the Turkish population.

INTRODUCTION

Caring for a family member who needs it can be a strain on the caregiver. To provide, develop and evaluate family support, caregiver reactions toward caregiving should be determined. To explore Turkish caregiver reactions toward caregiving, well-tested instruments are needed. The Caregiver Reaction Assessment Scale (CRA) is a comprehensive instrument for assessment of caregiver reactions. It has been validated in several languages. Reliable and validated Turkish version has not been studied yet. This study was conducted to determine the reliability and validity of the CRA to fill this gap.

Today, the developments in science and technology have extended the length of life despite chronic and life-threatening diseases (Turkey Healthy Aging Action Plan and Implementation Program 2015). The development of care and treatment methods and the change in lifestyles have directed the care of individuals towards home from the hospital environment. This con-

dition has increased the role of family members in the care of individuals with a chronic disease (Ploeg et al. 2017; Schulz et al. 2017; Turkey Healthy Aging Action Plan and Implementation Program 2015).

Problems experienced by individuals with a chronic disease and elders affect not only the patients, but the entire family (Grapsa et al. 2014; Schulz et al. 2017). Studies showed that the caregivers have physical, social, psychological and economic problems (Grant et al. 2013; Yeh et al. 2009). Caregivers are observed to have physical problems like backache and headache, as well as a number of psychosocial problems like anxiety, depression and social isolation (Beinart et al. 2012; Borman et al. 2016; Garre-Olmo 2016; Tang et al. 2012). However, there are also studies showing a decrease in the burden of caregivers with the help of a good support (Etters et al. 2008; Given et al. 2006; Martin-Carrasco et al. 2009; Northouse et al. 2010; Yeh et al. 2009). It is primarily required to determine the reactions of caregivers in order to reduce their burden. In order to determine the reactions, on the other hand, it is important to use a well developed instruments. The literature involves many instruments, which have been developed for measur-

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ing the possible reactions in caregivers taking care of elder patients with a chronic, life-threatening, physical or mental disease (Bachner et al. 2007). The Caregiver Reaction Assessment (CRA) scale is a subjective and multidimensional instrument with a good psychomotor feature measuring the negative and positive reactions. CRA was developed by Given et al. in 1992 for caregivers taking care of various patient groups and proven valid and reliable as a result of being applied to the partners of 377 patients with physical impairments and Alzheimer's disease.

The scale involves 24 items and five subscales as the disrupted schedule, financial problems, lack of family support, health problems and self-esteem of caregivers (Nijboer et al. 1999). The scale was applied in many different groups. There are studies that were conducted with individuals taking care of patients with different diseases. It was applied to the caregivers of patients with different types and stages of cancer (Applebaum et al. 2016; Ge et al. 2011; Given et al. 1992; Misawa et al. 2009; Nijboer et al. 1999; Persson et al. 2008; Petrinc et al. 2016; Yang 2013), caregivers of patients with dementia (Persson et al. 2008), caregivers of patients with rheumatoid arthritis (Jacobi et al. 2003), caregivers of children with central neural system diseases or damages (Labbe et al. 2002; Weyer et al. 2016), and the caregivers of patients that had gone through a cerebral hemorrhage (Bleijlevens et al. 2015; Grant et al. 2000) and elderly (Lou et al. 2015; Malhotra et al. 2012; Mota et al. 2015).

Majority of individuals with a chronic disease or elders in Turkey are generally taken care of by their relatives at home due to both economic and cultural reasons (Turkish Statistic Institute, 2016). There are studies aimed at determining the problems experienced by caregivers. However, these studies are mainly aimed at determining the psychosocial problems (Hacıalioglu et al. 2010; Karabulutlu et al. 2013; Yikilkan et al. 2014). There are no qualified and comprehensive scales to thoroughly evaluate the reactions of caregivers yet. There is a lack of studies measuring the possible reactions of caregivers in Turkey. Determining of the reactions of caregivers will be useful in planning interventions for caregivers.

Objective

The purpose of this study was to determine the reliability and validity of the CRA to fill this gap.

METHODOLOGY

Design and Sample

The phases of the testing of the scale included translation and language adaptation of the CRA Scale (CRA) (Beaton et al. 2007), content analysis by a expert group, and pre-test and psychometric evaluation (factor analysis, reliability coefficient and inter-item correlations). Sample size was determined by considering the principle that the sample size should be at least five times bigger than the total item number in validity and reliability studies (Akgül 2005). Sample size was calculated as at least five times bigger than the scale items and the sample for this study included 158 caregivers who care for their patients with cognitive and physical disabilities in their home. The inclusion criteria for the caregivers are a family member of the patient who is primarily responsible for the care of the patient, who can not perform at least two activities of daily living because of physical or cognitive impairment, ability to speak and understand Turkish, willing to participate in this study, provide care to patients at least three hours a day, and older than 18 years old.

Data Collection

The study was conducted between June 2011 and March 2012, in the one of the university hospital's outpatient's clinics of the neurology, the cardiology and the oncology and the office of the Alzheimer Association in Izmir, Turkey. Informed consent was obtained from all caregivers. Written permission was obtained from Dorothy Luckie to adapt the CRA into Turkish and use the instrument in this study. Approval to conduct the study was obtained from the one of the University Ethical Committees of the Institute of Health Sciences.

Instruments

Data was collected using a sociodemographic characteristics questionnaire, the Caregiver Reaction Assessment scale and the activities of daily living scale.

Sociodemographic Characteristics Questionnaire

The questionnaire contains questions about age, gender, education status, economic status,

working status, how many years and how many hours spent for their care responsibilities.

The Caregiver Reaction Assessment (CRA)

The scale aims to determine how the person taking care of a family member is affected by the process of caring. It involves a total of 24 items and five subscales regarding the condition of the caregiver. These subscales are as follows:

- ♦ *Impact on Finances:* Involves three items and measures the economic effect of the process of caring upon the caregiver.
- ♦ *Lack of Family Support:* Involves five items and measures the lack of family support for the caregiver and the perception of desolation.
- ♦ *Impact on Health:* Involves four items and measures the impairment of the health of the caregiver.
- ♦ *Impact on Schedule:* Involves five items and measures the effect of the process of caring upon the daily life of the caregiver.
- ♦ *Caregiver's Self-Esteem:* Involves seven items and measures the effect of caring upon the self-esteem of the caregiver and the positive experiences regarding the process of caring.

The impact of caregiving is evaluated with a five-point likert scale. For each subscale, a total score was computed as the average of the subsequent item scores, with a range between 1.00 and 5.00 (one point for "strongly disagree", two points for "disagree", three points for "undecided", four points for "agree" and five points for "strongly agree"). As the scale items evaluate different dimensions in caregivers' lives, there are no overall sum scores. A higher score indicates a stronger impact of caregiving (either negative or positive). The explanatory factor analysis evaluated five subscales (Given et al. 1992). All the subscales of the scale displayed a highly stable factor structure in cross-sectional and longitudinal studies that were performed in different caregiver populations (Ge et al. 2011; Malhotra et al. 2012; Misawa et al. 2009; Yang et al. 2013). Besides, the subscales score of CRA were observed to have a significant correlation with objective burden, caregiver's depression, mental health of caregivers and the life quality of caregivers. An internal consistency was determined in studies that were conducted with different caregiver groups. The reliability coefficient

varies between .56 (caregiver's health) and .84 (economic effects). The Cronbach's alpha coefficient is .85 for the entire sample and the entire scale. It has been determined as .79 for caregiver's self-esteem, .88 for lack of family support, .82 for impact on finances, .82 for impact on schedule, and .81 for impact on health (Given et al. 1992). The reliability and validity of the scale was studied in different cultures and languages (Ge et al. 2011; Malhotra et al. 2012; Misawa et al. 2009; Stephan et al. 2013; Yang et al. 2013).

Activities of Daily Living Scale

The Activity of Daily Living (ADL) index was used to determine the function levels of patients. The ADL index was developed by Katz et al. in 1963 in an attempt to evaluate the dependence of individuals in fulfilling their daily life activities. The ADL index involves six questions about the activities of bathing, dressing, toileting, transferring, continence and feeding. Each title of the ADL involves answer choices as 'dependent, partially dependent and independent'. In the ADL index, the scores between 0-6 are evaluated as dependent, 7-12 semi-dependent and 13-18 independent. The independence of elder's increases in parallel with the increase of scores (Shelkey 1999).

Data Analysis

Analysis was conducted using descriptive statistics and appropriate reliability and validity statistical tests using the Statistical Package for the Social Services SPSS 15.0 (SPSS Inc., Chicago, IL, USA). Validity of the instrument was tested with the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). To determine the appropriateness of exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used. By using the Barlett sphericity test, the meaningfulness of intervariable correlation coefficients was determined (Büyüköztürk 2007). For reliability analysis, Cronbach's alpha, item correlation and Hotelling T² test analysis were administered. Internal consistency was examined using Cronbach's alpha (coefficient alpha). The item-total item correlations were included in the analysis. Significance level was examined as .05 in all analyses.

RESULTS

Descriptive Statistics of the Caregivers and Their Patients

Descriptive data for caregivers and their patients is shown in Table 1. The average ages of caregivers were 49.58 years, 71.5 percent were female, 32.9 percent were higher education graduates, eighty-one percent were married and 76.6 percent were not working. It was also determined that 33.5 percent of the caregivers consisted of partners, 89.2 percent had social security, 74.7 percent had middle income and lived with the patients (77.2%), 42.4 percent had worked before with caregiving, 36.1 percent had been caregiving for 4 years or a longer period, and they provided caregiving for approximately 14.27 hours a day. The average ages of care recipients were 64.55 years and fifty-seven percent were female, 37.3 percent were cancer patients and their ADL score was 11.66.

Reliability

The Cronbach's alpha coefficient was .81 for the total scale. It shows that the internal consistency was sufficiently high for the total scale (Factor 1: .83, Factor 2: .84, Factor 3: .81, Factor 4: .80, Factor 5: .70). Item total score correlation coefficients of CRA ranged from .01 (lowest) to .71 (highest). Except for seven items (1, 3, 7, 17, 19, 20, 23) on the scale, the correlation coefficients were greater than .20, which is generally accepted as the lower bound by researchers. In the Hotelling T^2 test (Hotelling $T^2 = 170.069$, $p = .000$), it was revealed that the sample was not response biased in the scale. This shows that items in CRA were perceived similarly by caregivers.

Examining the general variance distributions of items in the scale, it was determined that they displayed a distribution between .496-26.898 and the factor loading was for items of factor one between .514-.830, for factor 2 between .288-.873, for factor 3 between 0.651-.818, for factor 4 between .199-.809 and for factor 5 between .241-.796 and the results were statistically significant ($p < 0.001$) (Table 2).

Examining the results of the Principle Component factor analysis that was conducted to determine the subscales of the scale, it was found

Table 1: Descriptive information regarding caregivers and patients (n: 158)

<i>Descriptive information</i>	<i>Number</i>	<i>Percentage</i>
<i>Caregiver Variables</i>		
<i>Age (year)</i>	X: 49.58 (SD: 11.50)	
<i>Gender</i>		
Female	113	71.5
Male	45	28.5
<i>Education</i>		
Literate/elementary school	61	38.6
High school graduate	45	28.5
University graduate	52	32.9
<i>Marital Status</i>		
Married	128	81
Single	30	19
<i>Working Status</i>		
Full time working	28	17.7
Part time working	9	5.7
Not working	121	76.6
<i>Insurance</i>		
Available	141	89.2
N/A	17	10.8
<i>Income</i>		
Income more than expenditure	26	16.5
Income equal to expenditure	118	74.7
Income less than expenditure	14	8.9
<i>Relationship to Care Recipient</i>		
Mother/Father	40	25.3
Daughter/Son	44	27.8
Spouse	53	33.5
Other Relatives	21	13.4
<i>State of Living Together</i>		
Yes	122	77.2
No	36	22.8
<i>Working Status Before The Care</i>		
Yes	67	42.4
No	91	57.6
<i>Caregiving Period (Year)</i>		
Less than 1 year	49	31
1-3 years	52	32.9
4 years or more	57	36.1
Daily caregiving duration (hr)	X: 14.27 (SD: 9.01)	
<i>Patient Variables</i>		
<i>Age (year)</i>	X: 64.55 (SD: 15.57)	
<i>Gender</i>		
Female	90	57
Male	68	43
<i>Diagnosis</i>		
Cancer	59	37.3
Dementia	52	32.9
Parkinson's Disease	38	24.1
Others	9	5.7
ADL scores	X:11.66 (SD: 3.57)	

that five factors. The Cronbach Alpha coefficients of subgroups were between .70-.84 and the variances between 4.535-26.898, and the cumulative variance distribution of these groups varied

Table 2: Descriptive statistics of CRA and Pearson correlation coefficient between the items and the total scale (n = 158)

Item	Items of CRA	M (SD)	Item-total correlation	If item deleted
<i>Factor 1: Impact on Schedule ($\alpha = .83$)</i>				
4	My activities are centered around care for ____.	2.40 $\pm$ 1.22	.47	.79
8	I have to stop in the middle of work.	2.63 $\pm$ 1.34	.63	.58
11	I visit family and friends less since I have been caring for ____.	2.30 $\pm$ 1.26	.62	.79
14	I have eliminated things from my Schedulesince caring for ____.	2.25 $\pm$ 1.23	.59	.79
18	The constant interruptions make it difficult to find time for relaxation.	2.59 $\pm$ 1.21	.70	.78
<i>Factor 2: Caregiver's Self-esteem ($\alpha = .84$)</i>				
1	I feel privileged to care for ____.	2.58 $\pm$ 1.40	.08	.81
7	I resent having to take care of ____.	2.22 $\pm$ 1.21	.02	.82
9	I really want to care for ____.	2.15 $\pm$ 1.21	.21	.81
12	I will never be able to do enough caregiving to repay ____.	2.06 $\pm$ 1.22	.22	.81
17	Caring for ____ makes me feel good.	2.32 $\pm$ 1.26	.01	.82
20	Caring for ____ is important to me.	2.04 $\pm$ 1.16	.18	.81
23	I enjoy caring for ____.	2.14 $\pm$ 1.15	.04	.81
<i>Factor 3: Impact on Finances ($\alpha = .81$)</i>				
3	My financial resources are adequate to pay for things that are required for caregiving.	3.28 $\pm$ 1.25	.15	.81
21	Caring for ____ has put a financial strain on thefamily.	3.01 $\pm$ 1.33	.50	.79
24	It's difficult to pay for ____ 's health needs andservices.	2.99 $\pm$ 1.32	.52	.79
<i>Factor 4: Lack of Family Support ($\alpha = .80$)</i>				
2	Others have dumped caring for ____ onto me.	3.38 $\pm$ 1.33	.28	.80
6	It is very difficult to get help from my family in taking care of ____.	3.10 $\pm$ 1.29	.47	.79
13	My family works together at caring for ____.	3.25 $\pm$ 1.39	.30	.80
16	Since caring for ____, I feel my family hasabandoned me.	3.27 $\pm$ 1.36	.37	.80
22	My family (brothers, sisters and children) left me alone to care for ____.	3.49 $\pm$ 1.30	.28	.80
<i>Factor 5: Health Problems ($\alpha = .70$)</i>				
5	Since caring for ____, it seems like I'm tired allof the time.	2.61 $\pm$ 1.28	.71	.78
10	My health has gotten worse since I've beencaring for ____.	2.92 $\pm$ 1.21	.68	.78
15	I have enough physical strength to care for ____.	3.26 $\pm$ 1.25	.20	.81
19	I am healthy enough to care for ____.	3.51 $\pm$ 1.19	.13	.81
Total Scale ($\alpha = .81$)				

between 26.898-65.172 (Table 2). The results were evaluated as statistically significant ($p < 0.001$).

Validity Analysis

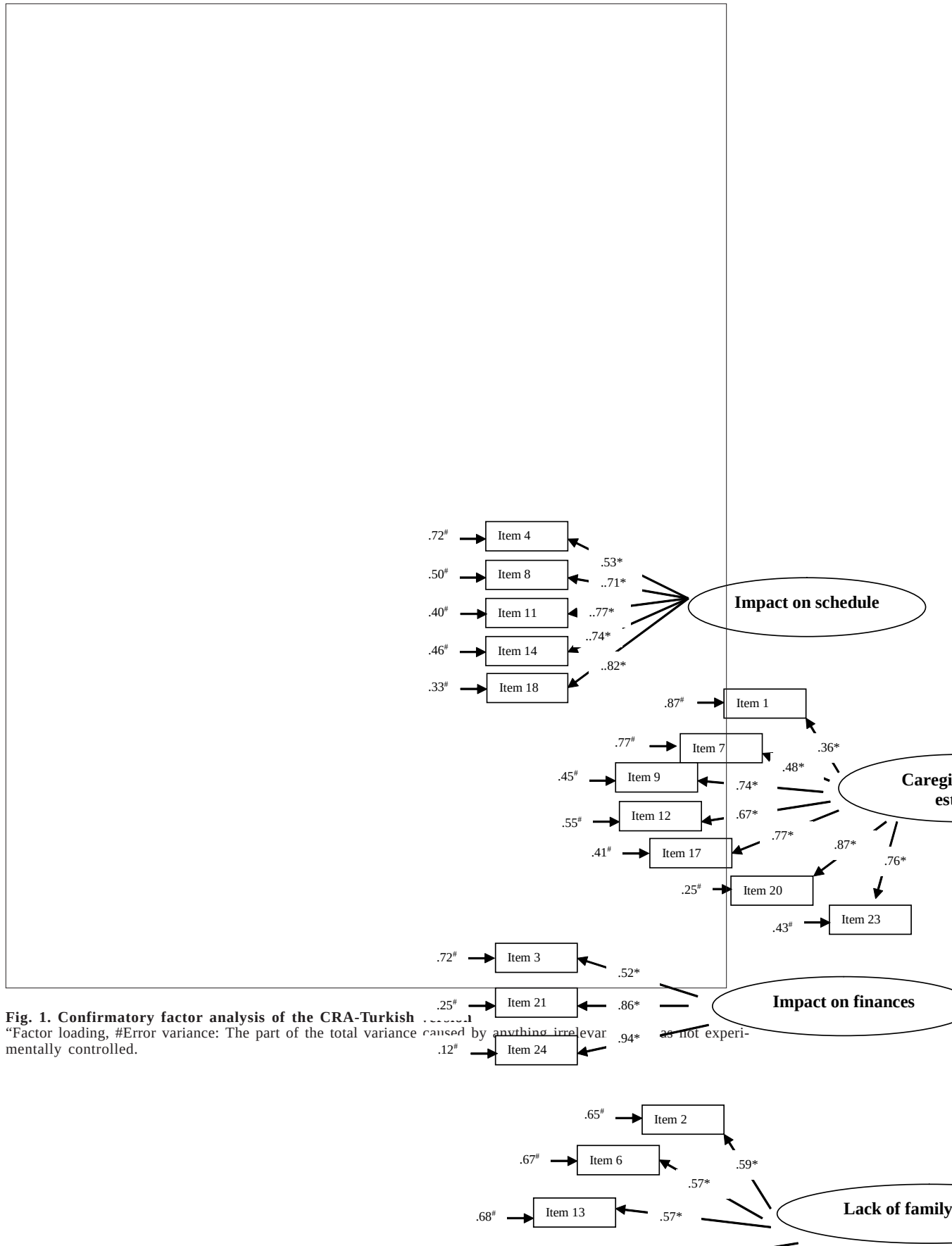
Construct Validity: As a result of exploratory factor analysis of CRA, it was found that KMO coefficient was .835 and Bartlett's Test result was 2128.311. The factor loadings of the CRA ranged from .33 to .94. The explained total variance was sixty-five percent. Figure 1 illustrates the model of CRA.

In the confirmatory Factor Analysis of the CRA, five subscales of the original scale were

tested in this study. Model concordance indices were determined as follows: $\chi^2 = 684.07$, $df = 242$, RMSEA = .108; GFI = .73; CFI = .89; NFI = .84, and NNFI = .87.

DISCUSSION

This study confirms the reliability and validity of the CRA in the Turkish population. The appropriateness of the Turkish version of the scale for the Turkish language and culture was assessed by 10 experts. Content validity of the CRA was assessed via Kendall W analysis of assessment scores given by experts to all items.



There were no statistical differences between scores given by the experts for each item (Kendall $W=.076$; $p = .68$) and the experts achieved consensus concerning all items.

In the factor analysis performed in the original scale, MSA (measure of sampling adequacy) was used. This is measure based on Kaiser-Meyer-Olkin's Formula and gives an indication as to how well a variable's correlation with other variables in the instrument can be accounted for on the basis of linear combinations of these other variables. In the present study, it was found that KMO coefficient was .835 and Bartlett's Test result was 2128.311. The literature emphasizes that Barlett's sphericity test should be statistically significant, and the KMO value should be at a minimum of .60 to carry out a factor analysis (DeVellis 2012, Johnson and Christensen 2014). In this study, Barlett's sphericity test and the KMO value were $p < .05$ and above .60 respectively, indicating that the data were appropriate and sufficient for factor analysis. In the original scale, variables with an MSA coefficient of less than .7 were excluded on the grounds that they showed little communality with the other variables in the instrument and thus would not load on any common factors (Given et al. 1992).

After an exploratory factor analysis in the original scale, the CRA comprised 24 indicator items forming five distinct unidimensional subscales. These components accounted for 65.1 percent of the variance among the 24 remaining study variables (Given et al. 1992). In the exploratory factor analysis, the total variance of the CRA scale was found to be sixty-five percent in the present study, which was compatible with the factor analysis results. The final model of Given et al. (1992) showed an adequate fit ($CFI = .97$, $NFI = .97$). In the CFA analysis of the CRA, the fit index was as high as in the CRA. In this study, it is found that $CFI = .89$ and $NFI = .84$. The literature accepts the model fit indicators higher than .90, X^2 / DF value lower than 5 and a RMSEA value lower than .08 as indicators of good fit (Simsek 2010). This study's CFA results were in line with the literature. Therefore, the researchers are confident that the scale was suitable for use in Turkish society. There were several differences between the factor loadings of this Turkish version and those of the original scale. Given et al. (1992) did not report any factor loading less than .20. The literature indicates that the minimum factor value should be .30 and

above (DeVellis 2012; Johnson and Christensen 2014). But in this study, seven items are lower than .20. When these items were excluded, there was no big improvement in Cronbach's alpha value so it was decided to leave it in the Turkish version of the instrument. As these items had a good fit, they were not excluded from the scale so as not to weaken the general structure of the scale. These fit index values indicated that the CRA was a tool that could be used in Turkish society and these values supported its construct validity.

In the original scale, the internal consistency was calculated for subscales and the Cronbach alpha values of the CRA subscales were found to be higher than .70 (Impact on schedule $\alpha = .82$, caregiver's self-esteem $\alpha = .90$, impact on finances $\alpha = .81$, lack of family support $\alpha = .85$, impact on health $\alpha = .80$). In the present study, impact on schedule $\alpha = .83$, self-esteem $\alpha = .84$, finances problems $\alpha = .81$, lack of family support $\alpha = .80$ and health problems $\alpha = .70$. These values showed that the subscales had a generally high level of reliability. There is only one subscale (health problems) that is just slightly less than the internal consistency reliability coefficient of the original scale. Thus, it is suggested that impact on health subscale of CRA is a moderately reliable, but the other subscales were found to be reliable for Turkish culture. The Japanese version of CRA was studied by Misawa et al. (2009) and in the result of factor analysis they found five factor structures same as the current study. The Cronbach's alpha coefficient score of impact on health subscale were found weak in the Japanese version of CRA (Misawa et al. 2009). On the other hand, there are studies that recommend four factor CRA scales with merging of the impact on schedule and health subscales (Malhotra et al. 2012; Petrinc et al. 2016).

The item-total score analysis explains the relationship between scores on the items and total score on the scale. It shows whether the items of the scale assess the desired characteristic (DeVellis 2012; Johnson and Christensen 2014). The acceptable coefficient in item selection should be higher than .20 or .25 (Gözüm and Aksayan 2002). In this CRA item analysis the item-total score correlation coefficients ranged from .02 to .71. In general, numerous researchers have used .20 as the lower boundary in practice, and in this study, only seven of all items were below this

level. But the items were good in fit with the subscales, therefore no items were excluded.

CONCLUSION

Determination of the reaction of caregivers by using the CRA will be useful for planning effective interventions to caregivers. As the scale was short, comprehensible, and suitable for Turkish culture, the researchers feel confident in its use to assess caregiver reactions toward caregiving. In conclusion, the results of this study provide support for the reliability and validity of the CRA for assessing Turkish caregiver reactions toward caregiving.

RECOMMENDATIONS

This study provided evidence that the CRA scale is a reliable and valid instrument for assessing Turkish caregiver reactions toward caregiving. Results show that the scale is acceptable for Turkish culture. It is easy and practical to use for both informants and investigators and appropriate for the Turkish Culture. The reliability and validity of CRA has been studied in many countries. The current study will provide the opportunity to do international comparative studies.

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