

A Turkish version of Myocardial Infarction Dimensional Assessment Scale (TR-MIDAS): Reliability–validity assesment

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Received 15 May 2009; received in revised form 28 April 2010; accepted 24 May 2010

Available online 26 June 2010

Abstract

Background: Many new measuring devices have been developed so that broader psychometric measurements in the coronary artery disease, disease-specific health status measurements, and identification of the broader quality of life can be performed in the recent years.

Aims: The study was intended to determine whether, and to what extent, MIDAS is a valid and reliable measurement to the patients suffering from myocardial infarction for the first time in Turkey.

Methods: The research was conducted with the patients hospitalized and treated with myocardial infarction in the cardiology departments of 2 hospitals in Istanbul, Turkey, between 2007 and 2008. Psychometric evaluations of TR-MIDAS were used for validity studies; language validity, content validity, construct validity were examined. For reliability studies; the tool's internal consistency reliability, Cronbach's alpha reliability coefficient, and test–retest reliability were completed.

Results: The instrument's content validity index was determined to be “0.95”. Principal component analysis revealed six factors with an eigenvalue >1.5. Cronbach's alpha was found to be 0.89 for total scale which was an acceptable value. The total's test–retest reliability was 0.51 ($p < 0.01$).

Conclusion: Data obtained at the end of the study supports that Turkish Myocardial Infarction Dimensional Assessment Scale is a valid and reliable instrument as a disease-specific scale to assess the patients' quality of life suffering from myocardial infarction in Turkey.

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Keywords: MIDAS; TR-MIDAS; Myocardial infarction; Disease-specific quality of life; Validity; Reliability

1. Introduction

It is estimated that nearly 2 million people in Turkey are exposed to Coronary Artery Disease (CAD) according to 10-year follow-up data (1990–2000) of the study regarding “Cardiac Disease and its Risk Factors in Adults in Turkey (TEKHARF)”, which has been conducted by Turkish Society of Cardiology (TSC) [1]. Based on the TEKHARF study, the prevalence of cardiac disease was found to be

6.7% in adults from 1990 up to now throughout Turkey; this value is 6.2% in males and 7.3% in females [1,2]. Coronary morbidity and mortality are estimated to rise up to 5% every year in Turkey [1].

Quality of life means how an individual perceives quality of his/her daily functional situations in physical and psychological aspects [3,4]. Quality of life is comprised of components, such as life satisfaction, subjective welfare state, happiness, functional ability and social welfare [5].

Quality of life utilized in many clinical studies plays a key role in determining the efficacy of the applied treatment and in making clinical decisions [6–8]. Therefore, the measuring devices especially developed to use the measurement for the quality of life after CAD in the clinical researches show a tendency to increasing each passing day [6].

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CAD is especially a suitable case for using the quality of life measurements, because most interventions are implemented to ensure an improvement in the quality of life, as well as to extend the lifetime. Quality of life measurements can mostly provide information with regard to how patients perceive their health conditions and can be shown as a beneficial guidance in the process of improving the quality of life [7]. Quality of life scales were developed to measure the quality of life grade of an individual's physical, mental and social welfare state, in contemplation of the fact that the individual dynamically interacts with his/her environment [9].

In the last 25 years, many state-of-the art measuring devices, such as The Quality of Life after Myocardial Infarction (QLMI), Cardiac Version IV of Ferrans and Powers Quality of Life Index have been developed in order to define the broader disease-specific health and quality of life measurements in CAD [7]. On the other hand, treatments and interventions with regard to myocardial infarction (MI) are changing and developing every passing day, and the measuring devices developed for MI fall behind. Therefore, the requirement to develop more sensitive disease-specific scales by which the quality of life is evaluated has taken place in the recent years [6]. The Myocardial Infarction Dimensional Assessment Scale (MIDAS) is a newer disease-specific scale [4].

The study was intended to determine whether, and to what extent, MIDAS is a valid and reliable measurement to the patients suffering from myocardial infarction for the first time in Turkey.

2. Methods

This study has a cross-sectional design for psychometric testing and validating of TR-MIDAS.

2.1. Participants

The research was conducted with the patients hospitalized and treated with the diagnosis of MI for the first time in the services of Cardiology Institute of Istanbul University (March 2007–September 2008) and Department of Cardiology of Cerrahpasa Faculty of Medicine (July–November 2008). The research sampling was formed with randomly selected patients through the patients hospitalized in the dates when the study was conducted. Patients who had survived the acute period (among 7 to 10th days following the diagnosis), were 70-year-old at most, had no complaint of chest pain and severe morbidity to prevent the participation in the study, were literate in Turkish language, had no severe mental disease and accepted to participate in the study were included in the sample. All patients who had the including criteria comprised the study. The purpose of the study was explained to the patients who conform to the selection criteria and all those who accept were included in the study. The sampling size would be sufficient as minimum

210 patients in such a way to be minimum 6 times the number of scale items (35 items) [3,5]. The number of patients included in the study was determined by taking into consideration the data collection time and the number of hospitalized patients who suffered from MI for the first time last year in the cardiology services during which the study was implemented. Target study sample was calculated by using power analysis at 5% significance level and 80% power value. Power calculation suggested the sample size as 228 patients. All patients who conform to the criteria were included in the study till reaching this number. Consequently, 230 patients were included in the study.

2.2. Measurement

The Myocardial Infarction Dimensional Assessment Scale (MIDAS) (Appendix A) developed by Thompson et al. [4] is indicated as a useful and highly reliable means to carry out disease-specific quality of life and health condition measurements of the patients suffering from MI, and to evaluate the applied treatments' effects on functional and welfare conditions. MIDAS was developed in a short, simple and intelligible structure in order to implement a broader line of the healthcare practices. In the study performed by Thompson et al. [4] and Wang et al. [10], MIDAS was found to have high internal consistency and construct validation. Because of these features, MIDAS was selected as a convenient scale to test the validity and reliability and used in the studies done on Turkish patients.

The original MIDAS consists of 35 items that measure 7 subscales of health condition after MI (Physical activity—12 items, Insecurity—9 items, Emotional reaction—4 items, Dependency—3 items, Diet—3 items, Concern over medication—2 items, and Side effects—2 items). The scale is started with the question “how often do you experience the following conditions in the last week after recovery from heart attack?” The patient was asked to choose the most suitable alternative through “never”, “occasionally”, “sometimes”, “often”, “always” for answer of each question. Each scale has a range from “0” (best possible health as measured by the scale) through to “100” (worst health as measured by the scale) [4].

2.3. Data collection and procedures

Turkish MIDAS (TR-MIDAS) was completed by the patients for a period of nearly 10–15 min in inpatient services. For retest of scale, the patients were provided with TR-MIDAS at the time of their discharge. The dates when the patients completed again after 15 days were written down on the forms. Markings carried out via telephone conversation on the form in that day were verbally learnt from the patients.

A three-stage route was followed to adapt MIDAS to Turkish language and Turkish culture and to test its validity and reliability in the study. At the first stage, language and

content validity of MIDAS, at the second stage, its construct validity and at the third stage, internal consistency and test–retest reliability were measured (Fig. 1).

2.3.1. Language and content validity

MIDAS was independently translated by the investigator and two English linguists as to establish language equivalency between its Turkish translation and English original text and to adapt to Turkish society. The draft of TR-MIDAS was prepared by selecting the most suitable items, and then the backward translation from English into Turkish was performed by two linguists who well know both languages. Both translations were compared and finalized with their English originals [11–13].

Subsequently, it was submitted to the expert's opinion for evaluating TR-MIDAS with regard to content validity [14]. At this stage, it was judged as to what extent the items within each dimension measure what they are intended to measure. The recommendations of 12 experts in their fields who are familiar with scale preparation techniques and methods were obtained for this purpose. Conformity of each item was assessed by the experts through grading between 1 and 4 (1: not suitable, 2: suitable a little/the phrase should be revised, 3: well suitable but minor changes should be made, and 4: very suitable). Content Validity Index (CVI) is the percentage calculated based on the total items rated by the experts as either 3 or 4. A CVI score of 80% or higher is considered to have good content validity [5,15].

Finally, the experts' opinions and recommendations were evaluated and language and content validity were approved after a pilot practice was performed with 10 patients conforming to the case selection criteria to test the intelligibility of the scale that language and scope validity were ensured.

2.3.2. Construct validity

A method commonly used when seeking theoretical validity is factor analysis [16]. Principle component analysis and varimax rotation were applied as in Chinese Mandarin-

MIDAS (CM-MIDAS) version [10] and factor analysis was utilized to reveal the construct validity of TR-MIDAS and to determine the factor loadings of the items and their dimensions included in the scale. The factor loading criterion of the items was set to 0.40 or above [17].

2.3.3. Reliability

In the examination of reliability regarding TR-MIDAS, test–retest and internal consistency assessments were performed. The time between two assessments should not be less than two weeks and not more than four weeks in test–retest investigations [5]. In the repeated measurements of TR-MIDAS, its ability to provide similar values was evaluated with the method of test–retest conducted two weeks apart in 81 patients [18].

The first interview was made between the 7th and 10th days after the emergence of patients from the intensive care unit and before their discharge to home. The scale is analyzed using the Spearman correlation coefficient due to the ordinal character of the Likert Scale ratings in order to test–retest reliability [18].

Cronbach's alpha and item to total correlation analysis were implemented to evaluate TR-MIDAS's internal consistency. A coefficient of greater than or equal to 0.70 was the preset as the acceptable criterion for reliability of the scale [5,14,19]. A higher value than 0.70 for Cronbach's alpha indicates good internal consistency of the items in the scale [19]. There is no certain standard for item to total correlation coefficient. Although it is stated that values of 0.50 and/or above are significant, it is mostly expected in practice that correlations are not negative and are above 0.20 so that collectability characteristics of the scale are not disturbed [5].

2.4. Data analysis

In this study, non-parametric tests were chosen since "Likert Type Scale" was used in the scale. CVI was used in evaluating the expert opinions for the content validity. Construct validity was tested with factor analysis. Internal consistency measurement (Cronbach's alpha coefficient), item to total correlation measurement and test–retest reliability analysis were utilized for the reliability analysis of the scale. Degree of the correlation of the variables was determined using Spearman Correlation Coefficient. The level of significance was set at $p < 0.05$.

Construct validity was tested by using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Kaiser–Meyer–Olkin (KMO) index and Bartlett's test of Sphericity were used to test the factorability of the item correlation matrix. The optimal number of factors was determined according to eigenvalues (> 1.0), screeplot and item loadings exceeding 0.40 [20].

Two distinct CFAs were conducted to confirm the six factor exploratory model and to compare this model with the original seven factor version of MIDAS. In CFA, the data fits

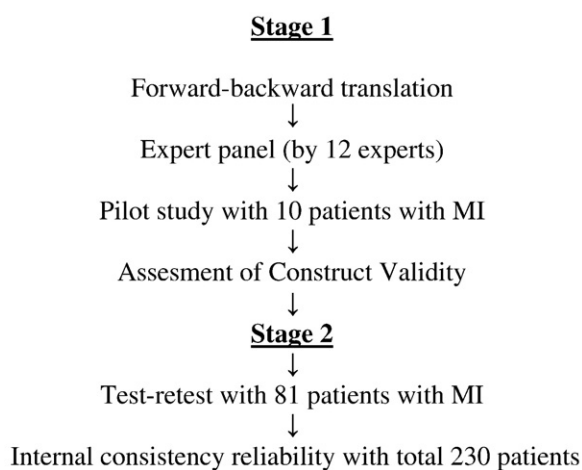


Fig. 1. Study design.

the model well when the proportion of chi-square to degrees of freedom (χ^2/df) is less than 5, the comparative fit index (CFI), goodness of fit index (GFI) and adjusted GFI (AGFI) are greater than 0.90, and when the root mean square error of approximation (RMSEA) and standardized mean square residual (SRMR) index are less than 0.08 [20]. Furthermore, the model with a smaller value of Expected Cross-Validation Index (ECVI) and Consistent Akaike's Information Criterion (AIC) is accepted to be a preferable model [20].

Statistical analyses were carried out using SPSS (Client Version 14.0) and LISREL (8.51) [20].

2.5. Ethical considerations

Prior consent of D.R. Thompson [4], who developed “The Myocardial Infarction Dimensional Assessment Scale—MIDAS” was obtained to adapt the scale into Turkish language and to carry out reliability and validity studies. Later on, the consents were obtained from the ethics committee and the institutions where the research would be conducted. Patients invited to participate in the study were informed in accordance with Helsinki Declaration and were included in the study after receiving their oral consents [14,21].

3. Results

Socio-demographic characteristics are shown in Table 1. In the study, for the individuals suffering from myocardial infarction for the first time 15.7% are female, 84.3% are male, in which 38.3% are in age group of 45 to 54, and 30.9% are in age group of 55 to 64.

The distributions of the subscales point means of the TR-MIDAS are presented in Table 2.

3.1. Validity

Amendments to the items 20, 29, 30 and 34 were made in line with the recommendations of the experts so that MIDAS may be adapted to Turkish culture and readily be understood by the Turkish patients with MI (Appendix A).

- Item 20 that was “Felt anxious about dying?” at the original scale was changed to “Did you have fear of death?”
- Item 29 that was “Felt concerned about your diet?” at the original scale was changed to “Did you consider the importance on your diet?”
- Item 30 that was “Felt concerned about your cholesterol level?” at the original scale, however, was changed to “Did you consider the importance on your cholesterol level?”
- Item 34 that was “Felt the cold more?” at the original scale was changed to “Did you feel that you were colder after you took your medicine?” In the study, the content CVI of TR-MIDAS items were determined as 0.95.

Table 1
Socio-demographic properties (n=230).

Socio-demographic properties	n	%
Gender		
Female	36	15.7
Male	194	84.3
Age		
30–44 years	26	11.3
45–54 years	88	38.3
55–64 years	71	30.9
65–70 years	44	19.1
Employment status		
Workman	18	7.8
Official	47	20.4
Retired	43	18.7
Housewife	32	13.9
Free	81	35.2
Unemployed	6	2.6
Farmer	3	1.3
Education		
Illiterate	3	1.3
Primary school	78	33.9
Secondary school	117	50.9
High school/univers.	32	13.9
Another medical diagnosis/health problems		
Bradycardia	5	2.2
Heart Failure	7	3
Hypertension	62	26.9
Tachyarrhythmias	10	4.3
Hyperlipidemias	61	26.5
Tip II Diabetes	39	17
COPD ^a + Astma	9	3.9
Diğer	15	4.6

^a COPD: Chronic Obstructive Pulmonary Disease.

For construct validity, the KMO measure of sampling adequacy was 0.82 exceeding the recommended value of 0.60 and the Bartlett's test of Sphericity was $\chi^2(276)=2612.375$ ($p \leq 0.001$). The KMO measures the sampling adequacy which should be greater than 0.60 for a satisfactory factor analysis to proceed. Both diagnostic tests confirm that the data are suitable for factor analysis. EFA was assessed to explore factor structure of TR-MIDAS as in original

Table 2
The distributions of subscales point means of the TR-MIDAS.

Subscales	TR-MIDAS ^a		
	(n=230)		
	Mean	SD ^b	Range
Physical activity	36.39	18.09	0–91.6
Insecurity	16.22	16.69	0–87.5
Emotional reaction	34.53	19.23	0–100
Social activity (new subscale)	32.98	16.15	0–87.5
Dependency	30.62	17.36	0–87.5
Concern over medication	17.01	20.65	0–100

Each scale has a range from “0” (best possible health as measured by the scale) through to “100” (worst health as measured by the scale).

^a TR-MIDAS: Turkish MIDAS.

^b SD=Standard Deviation.

MIDAS. The varimax rotation analysis further confirmed the components as in the CM-MIDAS study [10]. The EFA using principal component method with varimax rotation adjusted the six factors for TR-MIDAS based on examination of the screeplot and eigenvalues greater than 1.0, a scree test indicated a marginal discontinuity between the fifth and sixth factors. These six factors explained 65.15% of the total amount of variance and the variance rates were found to be 5.12 to 27.96 in the TR-MIDAS items. The factor pattern containing the item-to-factor loadings (>0.40), summary of eigenvalues, and percent explained variances are described in Table 6.

By considering those of initial eigenvalues above 1 [17,22] and using a loading criterion of 0.40 [23,24], 24 items of TR-MIDAS were placed in 6 dimensions unlike the original MIDAS with 35 items and having 7 dimensions. 11 items of original MIDAS (items 6, 9, 13, 15, 26, 28, 29, 30, 31, 34, and 35) were not loaded on any factors. While diet and medication side effects were removed, items 10, 11, 12 and 20 were loaded in a new factor that was called as “social activity”. The individual items in relation to the six factors solution are shown in Table 6.

Factor 1 (physical activity subscale; 27.96% of observed variance) consisted of six items (item numbers 1, 2, 3, 4, 5, and 7); factor 2 (insecurity subscale; 12.55% of observed variance) consisted of four items (item numbers 16, 17, 18, and 19); factor 3 (emotional reaction subscale; 7.33% of observed variance) consisted of four items (item numbers 22, 23, 24, and 25); factor 4 (social activity subscale; 6.78% of observed variance) consisted of four items (item numbers 10, 11, 12, and 20); factor 5 (dependency subscale; 5.39% of observed variance) consisted of four items (item numbers 8, 14, 21, and 27); and factor 6 (concern over medication subscale; 5.12% of observed variance) consisted of two items (item numbers 32 and 33). Based on the findings of EFA and original conceptualization of the TR-MIDAS of 7 factors [4,10], we conducted CFA for models of 6 factor and 7 factor solutions in order to compare the fit indices of the two respective factor structures (Table 5). The six factor model represented an acceptable model fit (RMSEA=0.078, GFI=0.83) [20].

3.2. Reliability

Reliability of TR-MIDAS was calculated via Cronbach’s alpha internal consistency coefficient, item to total correlation and test–retest methods.

In this study, the Cronbach’s alpha for the total scale was 0.88 which was acceptable value [18]. The six subscales had alpha ranged from 0.65 to 0.88 (Table 4). TR-MIDAS item to total correlation coefficient was positive and ranged from 0.34 to 0.81 for all of the items with statistical significance (Table 3). TR-MIDAS total grade test–retest value was found to be 0.63 ($n=81$, $p<0.01$). As may be observed in Table 3, test–retest correlations of MIDAS subscales range from 0.41 to 0.86. Finally, the results showed that the TR-MIDAS scale was reliable.

4. Discussion

In a study which compares 3 scales (SF-36, SAQ, and QLI) used to evaluate quality of life of the patients with coronary cardiac disease, Smith et al. [8] emphasized that the quality of life scales being used were less sensitive in evaluating the quality of life of patients with cardiac diseases and in the importance of developing more sensitive means in evaluating the quality of life of patients with cardiac diseases in the future, while authors Dougherty et al. [7] recommended that SAQ and SF-36 be used in the quality of life measurements.

In a study conducted with the patients with angina, MI and heart failure by using Chinese Mandarin-MIDAS (CM-MIDAS) version, authors Yu et al. [25] recommend the obtained results be strengthened with the studies to be made in the future. The existing studies show that disease-specific quality of life tools like MIDAS should be further tested and developed. The study about the adaptation of MIDAS to Turkish culture aims at bringing the possibility to put the quality of life assessment tool into practice in Turkish patients with myocardial infarction.

Four items (20, 29, 30, and 34) were re-arranged according to the recommendations of the experts so that MIDAS may be adapted to Turkish language and readily be understood by Turkish patients with MI (Appendix A).

- Item 20 was “Felt anxious about dying?” at the original scale. It was considered that the phrase “the patients have “fear” of death” would be more suitable than the phrase “the patients feel “anxious” about dying” against post-MI death, and the item 20 was changed to “Did you have fear of death?”
- Item 29 was “Felt concerned about your diet?” at the original scale. However, it was changed to “Did you consider importance on your diet?”
- Item 30 was “Felt concerned about your cholesterol level?” at the original scale. However, it was changed to “Did you consider importance on your cholesterol level?”
- Item 34 was “Felt the cold more?” at the original scale. This item is associated with side effect of the medication. Therefore, it was changed to “Did you feel that you were colder after you took your medicine?”

In order to adapt CM-MIDAS to Chinese culture and ensure that Chinese patients may more readily understand it, item 16 was changed and similar to our study, item 34 was changed [10].

In this study, CVI value (0.95) was higher than that (0.89) specified in CM-MIDAS version [13]. Mutual accord of viewpoints between the experts means that the entire scale reflects the field requested to be measured and content validation is ensured, which is a high scope validation [11,14]. In this direction, it was decided that the scale could be statistically evaluated without excluding any items.

In the study, factor analysis was used to determine the correlation between the scale variables by following similar

Table 3

Item to total correlations, internal reliability (Cronbach's α) and intraclass coefficient of the 6-factors TR-MIDAS.

ITEMS	Item to total correlation	6 factors	Intraclass coefficient
	(n=230)	Cronbach's α	(n=81)
	p<0.01	(n=230)	p<0.01
Physical activity		0.86	0.86
1. Did you think twice before any physical activity (such as housework or going to shopping)?	0.55		
2. Did you feel any pain or tightness on the chest?	0.81		
3. Did you have any pain or tightness on the chest that affects your life?	0.79		
4. Did you feel stagnation/feelingdown?	0.62		
5. Did you feel that you had no energy?	0.58		
7. While you were doing physical activity, did you feel pain or tightness on the chest area?	0.66		
Insecurity		0.84	0.42
16. Did you feel anxious while you were planning to travel?	0.59		
17. Did you feel yourself helpless?	0.72		
18. Did you feel yourself insecure?	0.72		
19. Did you feel changes about yourself confidence?	0.64		
Emotional reaction		0.78	0.53
22. Did you feel any quick-temper?	0.57		
23. Did you feel yourself in bad mood or in depression?	0.60		
24. Did you feel that your experience was a bad destiny?	0.62		
25. Did you feel yourself stressful/under stress?	0.57		
Social activity (new subscale)		0.69	0.56
10. Did you think that the activities were diminishing in your social life?	0.51		
11. Did you feel that you couldn't fulfill your responsibilities connected with the housework?	0.56		
12. Did your pain increase according to the changes in the climatic conditions?	0.49		
20. Did you have fear of death?	0.34		
Dependency		0.65	0.41
8. Did you feel bad because of restrictions?	0.38		
14. Did you feel yourself that you have been isolated from everything?	0.48		
21. Did you have worry about your future?	0.50		
27. Did you feel that you were losing your independence/freedom?	0.39		
Concern over medication		0.87	0.48
32. Were you worried about taking medicine?	0.77		
33. Were you worried about the side effects of your medicines?	0.77		
Total score		0.88	0.63

steps with CM-MIDAS version [10]. As the correlation between the variables decreases, the reliability to the results of factor analysis decreases as well. Items having high correlation will generally be included in the same factor. As a result, their relations with the factor where these variables are included will also be strong [26]. In the study, the result of the Bartlett's test of Sphericity was found to be statistically significant ($p \leq 0.001$), similar to CM-MIDAS version [10]. In our study, KMO measure of sampling adequacy was found to be very good (0.82) [23,24] which was similar to CM-MIDAS (0.87) version [10].

It was observed that total variance (65.15%) was very close to the total variance of CM-MIDAS (67.2%). Factor loading value is expected to be 0.30 and above [18,27]. It is also suggested that factor loading value is expected to be 0.40 and above [17,22,24]. Factor analysis conducted by using varimax rotation technique showed that 11 items were not loaded on any factors. As a result of varimax rotation, subscales of diet and medication side effects were removed and a new subscale with 4 items was added which is different

from the CM-MIDAS [10]. In the study 5 subscales of physical activity insecurity, emotional reaction, dependency, concern over medication remained similar with the original MIDAS and CM-MIDAS [4,10] (Table 4).

In this study, factors of TR-MIDAS and items loaded on factors changed as a function of adaptation to Turkish culture; the factor analysis resulted in 6 factors with 24 items. However, two distinct CFAs were conducted for six factor and seven factor models of TR-MIDAS to further compare the fit indices of two respective models. It was observed that six factor solution revealed better fit indices when compared with the seven factor solution ($\chi^2/df=2.37$, RMSEA=0.078, SRMR=0.080, ECVI=3.01, Model CAIC=972.65; $\chi^2/df=2.57$, RMSEA=0.083, SRMR=0.085, ECVI=6.83, Model CAIC=1986.70, respectively). Although none of the two models reached the baseline criteria for GFI, AGFI and CFI (GFI=0.83, CFI=0.86, AGFI=0.78; GFI=0.74, CFI=0.75, AGFI=0.70, respectively), the fit values of six factor solution of TR-MIDAS were relatively higher than the original seven factor solution. Nevertheless, according to

Table 4
Cronbach's α coefficients for Original MIDAS, CM-MIDAS^a and TR-MIDAS^b.

	Original MIDAS (2002) Cronbach's α	CM-MIDAS (2006) Cronbach's α	TR-MIDAS Cronbach's α
	n=348	n=180	n=230
Physical activity	0.95	0.94	0.86
Insecurity	0.93	0.90	0.84
Emotional reaction	0.88	0.86	0.78
Social activity (new subscale)	–	–	0.69
Dependency	0.74	0.74	0.65
Diet	0.76	0.79	Removed
Concern over medication	0.85	0.84	0.87
Medication side effects	0.75	0.71	Removed
Total score	–	0.93	0.88

^a CM-MIDAS: Chinese Mandarin-MIDAS.

^b TR-MIDAS: Turkish MIDAS.

CFA, it can be concluded that TR-MIDAS with six factors is a better solution than the original seven factor structure (Table 5). Thus, TR-MIDAS was accepted as a scale consisting of 6 subscales (Table 6). Factor loading values indicate the correlation between the variables and the selected factors. If a variable has the strongest correlation with a factor, this means that such variable is an element of that factor [26].

When MIDAS is evaluated with Cronbach's alpha coefficient over 24 items, its value is 0.88 for the entire scale and highly reliable. It is observed that “physical activity (0.86)”, “concern over medication (0.87)”, “insecurity (0.84)” subscales are highly reliable and “emotional

Table 5
Confirmatory Factor Analysis (CFA) of TR-MIDAS with 6-factors and 7-factors version for this sample in LISRELL.

	6 Factors-CFA	7 Factors-CFA
χ ² (df)	560.62(236), p<0.001	1375.08(535), p<0.001
χ ² /df	2, 37	2, 57
RMSEA*	0.078 (90% CI=0.069; 0.086)	0.083 (90% CI=0.077; 0.088)
ECVI**	3.01	6.83
SRMR*	0.080	0.085
GFI***	0.83	0.74
AGFI***	0.78	0.70
CFI****	0.86	0.75
Model CAIC**	972.65	1986.70

* RMSEA: Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Square Residual, <0.05 good, 0.05–0.08 acceptable.

** ECVI:Expected Cross-Validation Index, CAIC: Consistent Akaike's Information Criterion; the smaller values indicating a more preferable model.

*** GFI, AGFI >0.90 GFI:Goodness of Fit Index AGFI:Adjusted GFI.

**** CFI: Comparative Fit Index.

Table 6
Results of the Exploratory Factor Analysis (EFA) of the 6-factors for the TR-MIDAS using principal component analysis with varimax rotation (factor loadings >0.40 are highlighted).

Domains	Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
Physical activity	1	0.660					
	2	0.880		0.218			
	3	0.865		0.202			
	4	0.682	–0.253				
	5	0.618			0.269	0.270	
Insecurity	7	0.733			0.244		
	16		0.607		0.470		0.219
	17		0.814				
	18		0.813	0.201			
Emotional reaction	19		0.772				
	22		0.223	0.629			0.307
	23		0.249	0.717		0.203	
	24	0.221		0.821			
	25	0.342	0.296	0.514			0.329
Social activity	10	0.435			0.564		
	11	0.285			0.688		0.249
	12	0.219			0.743	–0.229	
	20			0.286	0.558		0.289
Dependency	8	0.281					0.653
	14		0.421				0.641
	21			0.308	0.394		0.622
	27		0.254	0.289			0.524
Concern over medication	32						0.909
	33						0.904
Eigenvalue		6.71	3.01	1.75	1.62	1.29	1.23
% Variance		27.96	12.55	7.33	6.78	5.39	5.12

Total variance=65.15%.

reaction (0.78)”, “dependency (0.65)” and “social activity (0.69)” subscales are very reliable (Table 3).

It is seen in Table 4 that close and similar results have been obtained in Cronbach's alpha values in the studies conducted using the original MIDAS and CM-MIDAS with the patients exposed to myocardial infarction [4,10]. This similarity in MIDAS results shows that the scale is highly reliable in measuring disease-specific quality of life and health condition of the patients with MI for both different cultures.

Another method showing internal consistency of a scale is item to total correlation coefficient. Item to total correlation coefficients for all the items of TR-MIDAS was found to vary from 0.34 to 0.84 (Table 3) and to be statistically significant at advanced level. The results of item to total score correlation coefficients for TR-MIDAS indicate that 24 items were included in the scale. To the extent that item to total correlations are high, the items of scale measure the same characteristics [5,28]. In the study, item to total correlation coefficients were accepted to be at least 0.30 [17,29].

5. Conclusions

Measurement for the quality of life which is an important guidance in planning the nursing care has a significant place in the nursing researches since it serves to the integrated

approach which is very important in nursing. In the light of these studies, it is seen that quality of life contributes to research on the disease process' effects on the daily life of patient, and analysis of such effects on the patient and to the development of a maintenance programme suitable for individual needs by determining social, emotional and physical requirements of the patient.

In conclusion, bringing a scale specialized to myocardial infarction in Turkish language and continuing the studies of Turkish scale development will decrease the difficulties experienced by the medical staff with regard to understanding of the patients and directing their treatments. MIDAS is a tool that is required to develop post-myocardial infarction training programme, that simplified the requirement for information obtained, and that has high scope validity and internal consistency with characteristics enough to measure qualities of life of the patients with myocardial infarction. Data obtained at the end of this study supports that the TR-MIDAS is a valid and reliable disease-specific instrument for assessing the health status of patients suffering from MI for the first time in Turkey. The six factor solution with 24 items of TR-MIDAS seems to reveal better fit index values than the seven factor version for MI patient population in Turkey. In the light of all results, it is recommended that six factor TR-MIDAS be used to evaluate quality of life in the patients with myocardial infarction in Turkey.

6. Limitations

Since MIDAS is a new scale, there are limited studies to discuss the TR-MIDAS results. The future studies will help the varied dimensions of MIDAS be understood and discussed more clearly.

The translation and cultural adaptation is solid work. This study comprised of a group of patients in one city of Turkey, therefore we recommend its validation in the other regions of Turkey.

As MI is an acute state, changes of general health status of the patients due to the natural progress of the health problem and the medical therapy are inevitable. Changes in health status formed an important limitation for the test–retest implementation done 15 days interval.

Acknowledgements

The authors wish to express their appreciation to Prof. Dr. David R. Thompson for giving the permission to use MIDAS in this study and Dr. H. Ozlem Sertel Berk for her very kind support in implementing the statistical analysis.

Appendix A. The Myocardial Infarction Dimensional Assessment Scale (TR-MIDAS)

Dear participant, since you have undergone the heart attack, in order to understand what you have lived in the last week we would like you to complete this questionnaire until the end of

the questions. Please mark the suitable cell which defines appropriately the frequency of your experiences about last week. You may use (X) or (√) marks while you are answering the questionnaire. Thank you for your cooperation.

Scoring of items: 1. Never, 2. Occasionally, 3. Sometimes, 4. Often, 5. Always.

Please only put a mark in one cell for each question.

	1	2	3	4	5
1. Did you think twice before any physical activity (such as housework or going to shopping)?					
2. Did you feel any pain or tightness on the chest?					
3. Did you have any pain or tightness on the chest that affects your life?					
4. Did you feel stagnation/feelingdown?					
5. Did you feel that you had no energy?					
6. Did you feel that you couldn't breathe properly?					
7. While you were doing physical activity, did you feel pain or tightness on the chest area?					
8. Did you feel bad because of restrictions?					
9. Did you need having more breaks?					
10. Did you think that the activities were diminishing in your social life?					
11. Did you feel that you couldn't fulfill your responsibilities connected with the housework?					
12. Did your pain increase according to the changes in the climatic conditions?					
13. Did you have worries about having another heart attack?					
14. Did you feel yourself that you have been isolated from everything?					
15. Did you feel yourself lonely?					
16. Did you feel anxious while you were planning to travel?					
17. Did you feel yourself helpless?					
18. Did you feel yourself insecure?					
19. Did you feel changes about yourself confidence?					
20. Did you have fear of death?					
21. Did you have worry about your future?					
22. Did you feel any quick-temper?					
23. Did you feel yourself in bad mood or in depression?					
24. Did you feel that your experience was a bad destiny?					
25. Did you feel yourself stressful/under stress?					
26. Did you feel the protective attitudes and approaches of your family and friends?					
27. Did you feel that you were losing your independence/freedom?					
28. Did you feel that you should trust to the others?					
29. Did you consider importance on your diet?					
30. Did you consider importance on your cholesterol level?					
31. Did you have worries about your weight?					
32. Were you worried about taking medicine?					
33. Were you worried about the side effects of your medicines?					
34. Did you feel that you were colder after you took your medicine?					
35. Did you have any side effects (example: cold hands or feet/night visits to the toilet etc.) after the start of taking medicines?					

References

- [1] Onat A, Hergenc G, Sansoy V, Soydan İ, Can G, Unal Tuna NE, Arslan P. TEKHARF solution to heart health secret for Turkish People, contribution to universal medicine. In: Onat A, editor. Argos/cortex communication services, Istanbul; 2007. p. 22–9.

- [2] Kultursay H. Coronary heart disease. Primary and secondary protection: introduction and epidemiology. Argos communication services Ads. Tic. A.Ş. Istanbul; 2001. p. 3.
- [3] NSW Department of Health. NSW Chronic Care Program rehabilitation for chronic disease implementing (2); 2006.
- [4] Thompson DR, Jenkinson C, Roebuck A, Lewin RJP, Boyle RM, Chandola T. Development and validation of short measure of health status for individuals with acute myocardial infarction: the Myocardial Infarction Dimensional Assessment Scale (MIDAS). *Qual Life Res* 2002;11:535–43.
- [5] Oksuz E, Malhan S. Health-centric living quality, calimetry. Ankara: Bilkent University; 2005. p. 1–105.
- [6] Roebuck A, Furze G, Thompson DR. Health-related quality of life after myocardial infarction: an interview study. *Journal of Advanced NursingBlackwell Science Ltd*; 2001. p. 787–94.
- [7] Dougherty CM, Dewhurst T, Nichol WP, Spertus J. Comparison of three quality of life instruments in Stable Angina Pectoris: Seattle Angina Questionnaire, Short Form Health Survey (SF-36), and Quality of Life Index-Cardiac Version III. *J Clin Epidemiol* 1998;51(7): 569–75.
- [8] Smith HJ, Taylor R, Mitchell A. A comparison of four quality of life instruments in cardiac patients: SF-36, QLI, QLMI and SEIQoL. *Heart* 2000;84:390–4.
- [9] Uneri O, Cakın Memik N. Living quality concept in children and review of quality of life scales. *Child Adolesc Ment Health J* 2007;4 (1):48–56.
- [10] Wang W, Lopez V, Thompson DR. A Chinese Mandarin translation and validation of the Myocardial Infarction Dimensional Assessment Scale (MIDAS). *Qual Life Res* 2006;15(7):1243–9.
- [11] Eser E. Cultural adaptation of SYK scales. 1. Life Quality in Health Symposium, Izmir; 2004.
- [12] Maneesriwongul W, Dixon JK. Instrument translation process: a methods review. *J Adv Nurs* 2004;48(2):175–86.
- [13] Bek N, Simsek E, Erel S, Yakut Y, Uygur F. Turkish version of impact on family scale: a study of reliability and validity. *Health Qual Life Outcomes* 2009;7:4.
- [14] Erefe İ. Research in Nursery, Principle, Process and Methods. The features of data collecting tools. HEMAR-G publish Number: 1, Odak Offset, Istanbul; 2002. p. 169–88.
- [15] Yurdagül H. Utilization of content validity indexes in scale improvement studies. XIV.National Education Sciences Congress, Pamukkale University Faculty of Education, Denizli; 2005.
- [16] Arslan S. Attitude scale regarding computer aided education. *Yuzuncu yıl Univ Fac Educ J* 2006;3(2):24–33.
- [17] Akgül A, Çevik O. Techniques of statistical analysis. Management administration applications in SPSS. Ankara: Emek Offset; 2003. p. 417.
- [18] Gozum S, Aksayan S. A guide for trans-cultural scale adaptation II. Psychometric characteristics and cross-cultural comparisons. *Turk J Nurs Res* 2003;5(1):3–14.
- [19] Gliem JA, Gliem RR. Calculating, interpreting and reporting Cronbach's alpha reliability coefficient for Likert-Type Scales. 2003 Midwest research to practice conference in adult, continuing and community education. Columbus: The Ohio State University; 2003.
- [20] Şimşek ÖF. Introduction to structural equation modelling: basic principles and LISREL applications. Ekinoks; 2007.
- [21] Babadag K. Ethic in Nursery. *Nursery Bulletin, Istanbul University Florence Nightingale Nursery High-school Publish Organ*, 5(19). Istanbul: I.U. Printing House and Film Center; 1991. p. 5.
- [22] Tavşancıl E. Measuring attitudes and data analysis with SPSS. Second edition. Ankara: Nobel Company; 2005. p. 16–51.
- [23] Field A. Research methods II: factor analysis on SPSS; 2005.
- [24] Habing B. Exploratory factor analysis. University of South Carolina; 2003.
- [25] Yu DS, Thompson DR, Yu CM, Olridge NB. Assessing HRQL among Chinese Patients with Coronary Heart Disease: Angina, myocardial infarction and heart failure. *Int J Cardiol* 2009;24(131(3)):384–94.
- [26] Karagoz Y, Kosterelioglu İ. Developing the communication skills evaluation scale through factor analysis method. *Dumlupınar Univ Soc Sc J* 2008;21.
- [27] Akgul A, Cevik O. Statistical analysis, management administration applications in SPSSSecond edition. ; 2005. p. 440. Ankara.
- [28] Ercan İ, Kan İ. Reliability and validity at the scales. *Uludag Univ Fac Med J* 2004;30(3):211–6.
- [29] Costa Santos C, Costa Pereira A, Bernardes J. Agreement studies in obstetrics and gynaecology: inappropriateness, controversies and consequences. *Br J Obstet Gynaecol* 2005;112(5):667–9.