

# The Reliability and Validity of the Turkish Version of the World Health Organization Quality of Life Instrument-Older Adults Module (WHOQOL-Old)

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## Abstract

**Purpose:** To determine the psychometric properties of the Turkish version of the World Health Organization Quality of Life Instrument-Older Adults Module (WHOQOL-Old).

**Methods:** The Turkish version of the WHOQOL-OLD was administered to 527 older (> 65 years) adults living in urban, suburban, and rural areas of Manisa Province, Turkey. The WHOQOL-OLD module consists of 24 items assigned to 6 facets (sensory abilities, autonomy, past, present and future activities, social participation, death and dying, and intimacy) and is a supplementary module of WHOQOL-BREF. The WHOQOL-BREF and GDS-30 were also administered to the participants. A confirmatory approach was used during reliability and validity analysis. SPSS v.10.0 and LISREL v.8.54 were used for analysis.

**Results:** Mean age of the participants was 71.06 ± 5.20 years and the overall WHOQOL-OLD score was 56.02 ± 11.86. In all, 54.5% of the participants were female and 60.5% reported to be in poor health. Both ceiling and floor effects of the WHOQOL-OLD were satisfactory (< 0.05%). Alpha values for the facets and overall scale (range: 0.68-0.88) (> 0.70), and item total correlations and overall scale success were satisfactory. As a measure of the construct validity of the scale, confirmatory factor analysis showed very high CFI values (range: 0.936-0.999) for each of the domains. Convergence of WHOQOL-OLD facet scores on WHOQOL-BREF domains and WHOQOL-OLD were very fine in general.

**Conclusions:** The psychometric properties of the Turkish version of the WHOQOL-OLD were acceptable, indicating that the scale is reliable and valid for use with older Turkish adults (> 65 years).

**Key Words:** Older adults, Cultural adaptation, reliability and validity, quality of life

## INTRODUCTION

Today, public health policies, both in the developed and developing world, are increasingly directed towards maintaining the elderly populations' independence and integration with the wider community. The WHO (2007) reports that in 2000 there were 600 million people aged 60 years and over, and that there will be 1.2 billion by 2025 and 2 billion by 2050. The WHO also suggests that populations in developing countries will become elderly before they become rich, while those in industrialized countries will become rich before they become elderly, emphasizing that worldwide all countries need to be prepared to address the consequences of ag-

ing populations. As it was stated for the rationale of the WHO Aging and Health Program, "the health of the elderly should not and cannot be examined simply from the vantage-point of disease prevalence or the absence of illness. Even when they are ill, large numbers of the elderly feel perfectly healthy because their illness does not have any major adverse effects on their daily lives" (WHO 1998). As such, self-reported health status is a concept that is increasing in importance for the elderly.

Health-related quality of life (HRQOL) is a relatively new concept that focuses on perceived health and happiness, which are very important to the elderly. HRQOL is very sensitive to the harmful and devastating effects of

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**TABLE 1.** Sociodemographic properties of the study population (n = 527).

Property	n	%
Age		
< 80 years	485	92.0
≥ 80 years	42	8.0
Mean ± SD	71.05 ± 5.22	
Median	70.00	
Min	60	
Max	96	
Gender		
Male	240	45.5
Female	287	54.5
Disease status		
Ill	319	60.5
Well	208	39.5

chronic illness in the elder population. It is very important to increase the level of HRQOL among the elderly, as treatment is not always possible for them.

HRQOL assessment in the elderly covers a wide range of concerns, including social and emotional wellbeing, in addition to health variables such as pain, fatigue, and functional ability (Pinquart and Sörensen 2000, Constança et al. 2003, Efklides A et al. 2003, Borg et al. 2006, Paskulin and Molzahn 2007, Low and Molzahn 2007, Lucas 2007) The use of HRQOL assessment is increasing as a way to identify vulnerable members of the elderly population and to target interventions, but HRQOL assessment is not always possible due to the lack of valid HRQOL assessment tools. Generic instruments that aim to assess multiple aspects of health and quality of life (QOL), in both patients and the general population, are especially important for assessing HRQOL in the elderly, as most elderly individuals have multiple health and social problems.

Brown et al. reported that social activities, leisure, and health are the 3 primary factors that influence QOL in the elderly (Browne et al. 1994). Data from the Czech Republic Center of the WHOQOL-OLD show that the most important factor affecting QOL in the elderly is a depressive mood. (Dragomirecká et al. 2008). A recent study conducted by Molzahn and Gail shows that health, financial status, and meaning of life are the conceptual factors that affect HRQOL in the elderly (Molzahn and Gail 2007), whereas personal relationships, health, and sexuality are the most important variables that explain their overall QOL (Robinson and Molzahn 2007). In a literature review of generic health instruments used in the elderly, Haywood et al. (2005) referred to only HRQOL measures developed primarily for the adult population, not specifically for the elderly. Currently there are only a few generic instruments—many of which would not be regarded as having comprehensive conceptual structures for evaluating HRQOL—designed for use with the elderly, such as the Philadelphia Geriatric Center (PGC) Morale Scale, Instrumental Activities of Daily Living (IADL), Physical Self-Maintenance Scale, and London Handicap Scale (LHS) (Lawton 1975, Lawton and Brody 1969, Brody and Lawton 1988, Harwood et al. 1994). Based on this need, the WHOQOL Group developed and validated a module (WHOQOL-OLD) of the WHOQOL (World Health Organization Quality of Life Questionnaire) for the elderly in 22 countries simultaneously (Bullinger et al. 1996).

As a profile type generic HRQOL measure, the WHOQOL has 2 versions: WHOQOL-100 and WHOQOL-BREF with 26 items. The WHOQOL-100 consists of 25 facets and 6 domains, whereas the WHOQOL-BREF has only 4 domains. The scale structure of the WHOQOL, the psychometric proper-

**TABLE 2.** Descriptive statistics and internal consistency for sub-scales of the WHOQOL-OLD.\*

WHOQOL-OLD domains (n = 327)	Mean ± SD	%		Skewness	Internal Consistency (α)
		At Floor	At Ceiling		
Sensory abilities	12.87 ± 3.56	0.8%	3.6%	0.029	0.88
Autonomy	13.35 ± 2.64	0.2%	0.8%	-0.196	0.68
Past, present, and future activities	12.95 ± 2.68	0.9%	0.2%	-0.392	0.73
Social participation	12.28 ± 2.96	0.6%	0.6%	-0.211	0.76
Death and dying	11.85 ± 3.82	3.8%	2.5%	0.043	0.75
Intimacy	14.48 ± 2.44	0.0%	1.9%	-0.282	0.82
Overall	77.78 ± 11.37	0.0%	0.0%	0.114	0.85

\*WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module.

**TABLE 3.** Item descriptive results and item-scale correlations corrected for overlap for coefficients followed by (\*) (SE = 0.02).

Item number	DOMAIN	Item (a) (During passed week ...)	Mean ± SD	Total QOL	Sensory	Autonomy	Past, Present, Future	Social interact.	Death & Dying	Intimacy	Cronbach's Alpha vales	Cronbach's Alpha if item deleted
1	Sensory abilities	Impairment to senses affect daily life	3.23 ± 1.07	.41*	.82*	.18	.13	.18	.19	.09	0.88	0.807
20		Rate sensory functioning	3.07 ± 0.95	.51*	.52*	.33	.38	.42	.10	.22		0.918
2		Loss of sensory abilities affect participation in activities	3.31 ± 1.08	.41*	.84*	.17	.12	.15	.24	.05		0.798
10		Problems with sensory functioning affect ability to interact	3.26 ± 1.07	.45*	.77*	.19	.17	.23	.23	.09		0.827
3	Autonomy	Freedom to make own decisions	3.69 ± 0.93	.49*	.28	.49*	.40	.29	.15	.33	0.68	0.606
4		Feel in control of your future	3.00 ± 0.92	.42*	.18	.51*	.32	.32	.13	.25		0.591
11		Able to do things you'd like to do	3.05 ± 0.92	.49*	.17	.40*	.53	.53	.01	.36		0.660
5		People around you are respectful of your freedom	3.61 ± 0.90	.38*	.08	.47*	.36	.26	.04	.44		0.616
19	Past present future	Happy with things to look forward to	2.97 ± 0.95	.46*	.23	.33	.48*	.54	.01	.30	0.73	0.689
12		Satisfied with opportunities to continue achieving	3.00 ± 0.91	.55*	.17	.54	.58*	.47	.05	.47		0.632
13		Received the recognition you deserve in life	3.51 ± 0.85	.45*	.18	.39	.48*	.32	.05	.45		0.687
15		Satisfied with what you've achieved in life	3.47 ± 0.89	.45*	.10	.41	.53*	.52	-.04	.39		0.661
16	Social interact.	Satisfied with the way you use your time	3.18 ± 0.87	.48*	.16	.40	.54	.61*	-.07	.41	0.76	0.673
17		Satisfied with level of activity	3.14 ± 1.01	.53*	.19	.44	.54	.67*	.00	.41		0.633
14		Have enough to do each day	3.02 ± 0.92	.38*	.18	.34	.37	.49*	-.07	.33		0.734
18		Satisfied with opportunities to participate in the community	2.94 ± 1.08	.53*	.32	.32	.47	.47*	.14	.35		0.753
6	Death Dying	Concerned about the way you will die	2.90 ± 1.19	.35*	.24	.18	.04	.01	.71*	.09	0.75	0.604
7		Afraid of not being able to control death	3.09 ± 1.26	.32*	.30	.08	.03	.04	.69*	.05		0.608
8		Scared of dying	3.24 ± 1.39	.18*	.15	.02	.01	-.06	.56*	-.03		0.689
9		Fear pain before death	2.62 ± 1.18	.12*	-.02	.09	.00	.04	.27*	.07		0.827
21	Intimacy	Feel a sense of companionship in life	3.50 ± 0.76	.46*	.13	.33	.43	.43	.06	.59*	0.82	0.806
22		Experience love in your life	3.61 ± 0.74	.47*	.09	.39	.49	.36	.05	.68*		0.763
23		Opportunities to love	3.72 ± 0.78	.49*	.10	.45	.44	.41	.05	.69*		0.761
24		Opportunities to be loved	3.65 ± 0.73	.43*	.09	.39	.39	.38	.02	.64*		0.785

ties of the international version, and Turkish validation of this scale were published elsewhere (The WHOQOL Group. 1994, The WHOQOL Group 1995, Eser et al. 1999, Skevington et al. 2004). The WHOQOL-OLD Project was funded by the European Commission Fifth Framework. The global findings of this module were also published elsewhere (Development of the WHOQOL-OLD). Among the 22 study centers, the Turkish (Izmir) Center simultaneously developed the Turkish version of the scale. The WHOQOL-OLD is not only the first generic HRQOL measure for the elderly de-

veloped in Turkey, but also the first in Eastern Mediterranean and Middle East countries. As the results of this validation study are expected to provide important clues about the perceptions of the elderly in developing countries as well. The aim of the present study was to determine the psychometric properties, and the reliability and validity of the Turkish version of the WHOQOL-OLD. This new supplementary module was developed for use in conjunction with the WHOQOL in population epidemiology and clinical intervention trials in Turkey.

**TABLE 4.** Scale success (%) summary of item discriminant validity tests.

Scale	Scale Success for WHOQOL-OLD Domains*				
	-2	-1	1	2	1+2
Sensory abilities	0 0.0	0 0.0	0 0.0	20 100.0	20 100.0
Autonomy	2 10.0	0 0.0	3 15.0	15 75.0	18 90.0
Past, present, and future activities	0 0.0	1 5.0	3 15.0	16 80.0	19 95.0
Social participation	0 0.0	0 0.0	2 10.0	18 90.0	20 100.0
Death and dying	0 0.0	0 0.0	0 0.0	20 100.0	20 100.0
Intimacy	0 0.0	0 0.0	0 0.0	20 100.0	20 100.0
Overall	2 1.7	1 0.8	8 6.7	109 90.8	117 97.5

\*Summarized based on the findings presented in Table 3.

2: Item has significantly higher correlation with its own domain.

1: Item has higher correlation with its own domain.

-2: Item has significantly lower correlation with its own domain.

-1: Item has lower correlation with its own domain.

## MATERIALS AND METHODS

### The Global WHOQOL-OLD Project

The WHOQOL-OLD Project was funded by the European Commission Fifth Framework Program, QLRT-2000-00320, and was carried out in 22 countries under the auspices of the World Health Organization Quality of Life Group (WHOQOL Group). Based on the published WHOQOL standard project methodology (The WHOQOL Group, 1998a, The WHOQOL Group 1998b), a study protocol was developed, including focus group work, item generation, pilot testing, item reduc-

tion, and the quest for domains. During the first stage a 40-item pilot WHOQOL-OLD module was generated from the focus groups' results and global analysis of the international project, and then that module was reduced to the 24-item WHOQOL-OLD 24-item module via field trial testing in 6 domains (Power et al. 2005).

### Local Cross Cultural Validation Study

Herein is a presentation and discussion of the psychometric properties of the Turkish version of the WHOQOL-OLD module.

### Participants

The field trial was conducted with an opportunistic sample of 527 older (> 65 years of age) adults living in rural and suburban areas of Manisa Province, Turkey. Mean age of the participants was  $71.06 \pm 5.20$  years (range: 65-96 years), of which 54.5% were female and 60.5% reported to be in poor health (Table 1).

### Measures

The measures used in this study were the WHOQOL-OLD Field Trial Module, WHOQOL-BREF, and Geriatric Depression Scale (GDS). The short version of the WHOQOL (WHOQOL-BREF) was preferred over the long version (WHOQOL-100) in order to avoid concentration problems in under-educated participants. The GDS was used together with the other questionnaires because it is the only valid measure available in Turkey for assessing potential depression in older adults.

### WHOQOL-OLD Field Trial Module

The WHOQOL-OLD Field Trial Module consists of 24 items and a 5-point Likert-type scale assigned to 6 facets: sensory abilities (items 1, 2, 10, and 20), au-

**TABLE 5.** Inter-correlations\* between the WHOQOL-OLD sub-scales.

	Sensory abilities	Autonomy	Past, present, and future activities	Social Particip.	Death & Dying	Intimacy
Sensory abilities	-					
Autonomy	.25	-				
Past, present, and future activities	.23	.56	-			
Social participation	.28	.49	.63	-		
Death and dying	.23	.12	.02	.01	-	
Intimacy	.13	.48	.54	.49	.05	-
Overall **	.34	.57	.58	.55	.13	.48

\*All correlations are statistically significant at  $P < 0.001$

\*\*Corrected for overlap

WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module.

**TABLE 6.** Results of confirmatory factor analysis\* of the WHOQOL-OLD scale on the original data set (n = 527).

	CFI**
Sensory abilities	0.983
Autonomy	0.961
Past, present, and future activities	1.000
Social participation	0.988
Death and dying	0.939
Intimacy	0.997
Total ***	0.936

\*Conducted using Lisrel v.8.5.

\*\*\*Comparative fit index.

WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module.

tonomy (items 3, 4, 5, and 11), past, present and future activities (items 12, 13, 15, and 19), social participation (items 14, 16, 17, and 18), death and dying (items 6, 7, 8, and 9), and intimacy (items 21, 22, 23, and 24). Possible facet scores range from 4 to 20. A total score can also be calculated by summing each of individual item values. Higher scores indicate higher QOL.

The sensory abilities facet assesses sensory functioning and the impact of the loss of sensory abilities on QOL. The autonomy facet refers to independence in old age and thus describes the ability to live independently. While the past, present, and future activities facet describes satisfaction with achievements in life and about looking towards the future, the social participation facet delineates participation in activities of daily life, especially community-based activity. The death and dying facet is related to concerns, worries, and fears about death and dying, while the intimacy facet assesses personal and intimate relationships.

## WHOQOL-BREF

The WHOQOL-BREF is the short version of the WHOQOL-100. It contains 1 item from each of the 24 QOL facets included in the WHOQOL-100, plus 2 benchmark items from the general facet on overall QOL and general (not included in the scoring). The instrument is currently scored in 4 domains: Domain 1: physical health; domain 2: psychological health; domain 3: social relationships; domain 4: environment health. The rationale for the development of the WHOQOL has been described in detail in a number of publications (The WHOQOL Group 1994, The WHOQOL Group 1995).

## Geriatric Depression Screening Scale (GDS)

The GDS includes 30 items, was developed by Yesavage (Yesavage et al. 1983), and was adapted for use in by Turkey Ertan et al. (1997). Higher scores indicate a more severe depressive mood.

## Statistical Analysis (reliability and validity analysis)

A confirmatory approach was used both in the reliability and validity analysis of the instrument, which means that its structural consistency with the hypothetical structure suggested by the researchers at the beginning was explored. The descriptive parameters, such as mean, SD, and ceiling and floor effects, were used in the psychometric evaluation of the instrument, and then reliability and validity analysis was performed. Ceiling and floor effects refer to obtaining maximum good or bad health scores in more than 20% of the participants (Fitzpatrick et al. 1998).

Reliability analysis consisted of the evaluation of the internal consistency of item-responses and item analy-

**TABLE 7.** Discriminative ability of the WHOQOL-OLD\*\* total and sub-scale scores among sociodemographic subgroup categories of the study population.

		Sensory abilities	Autonomy	Past, present, future activities	Social Particip.	Death and dying	Intimacy	Total
Age	p*	0.000	0.452	0.017	0.220	0.126	0.383	0.002
(< 80 > 80 years)	effect size #	0.777	0.103	0.370	0.234	0.279	0.137	0.495
Sex	p*	0.537	0.004	0.225	0.026	0.591	0.012	0.093
(female vs. male)	effect size #	0.045	0.244	0.105	0.191	0.052	0.215	0.149
Self-Reported Health Status (Ill < Well)	p*	0.000	0.000	0.000	0.000	0.758	0.137	0.000
	effect size #	0.397	0.400	0.338	0.503	0.021	0.131	0.451

\*Student's t test.

#Effect size (ES) = (mean 1 – mean 2)/pooled SD.

ES evaluation suggestions: 0.20 = small effect; 0.50 = moderate effect; 0.80 = large effect (Cohen J., 1988).

\*\*WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module.

**TABLE 8.** Convergent validity of the WHOQOL-OLD on WHOQOL-BREF and GDS.\*\*

	WHOQOL-OLD Domains					
	Sensory abilities	Autonomy	Past, present, and future activities	Social Particip.	Death and dying	Intimacy
WHOQOL-BREF Physical	.487*	.464*	.472*	.628*	.268*	.485*
WHOQOL-BREF Psychological	.441*	.522*	.597*	.656*	.288*	.539*
WHOQOL-BREF Social relat.	.241*	.456*	.528*	.578*	.105 (ns)	.576*
WHOQOL-BREF Environmental	.432*	.501*	.599*	.596*	.097 (ns)	.561*
GDS	.552*	.210*	.242*	.283*	.262*	.099 (ns)

\*Significant at  $P < 0.001$ ; (ns) non-significant.

\*\*WHOQOL-BREF: World Health Organization Quality of Life Instrument-Short Version; WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module; GDS: Geriatric Depression Scale.

sis (Ware et al. 1997). A correlation matrix was established among all the individual items and domain scores (Table 3). If Pearson's product moment coefficients between the items and their own scale score (corrected for overlap) were higher than the correlations between these items and any other domain, it was considered that the WHOQOL-OLD domains represented separate entities, indicating good psychometric performance of that individual item. Internal consistency of the domains was assessed by Cronbach's alpha values. As a second method for the assessment of individual item performance, alpha values were also separately calculated for each domain after removing each of the items one at a time. The MAP statistical package was used for reliability analyses.

Validity analysis consisted of internal and external construct validity testing. Item convergent and divergent (known groups validity, external validity) validity analyses, and confirmatory factor analysis were conducted for construct validity testing. Multiple linear regression analysis was used for criterion validity assessment. The external construct validity (discriminative ability) of the instrument between a subgroup without any self-reported condition and a subgroup with at least 1 condition was assessed using Student's *t* test. This type of validity can also be referred to as group validity of the measurement. Effect size analysis was also conducted to indicate the strength of statistical differences. Effect size statistics can also be regarded as a distribution-based assessment of responsiveness that provides a standardized unit of expression of the size and meaning of score change, supporting the comparison of instrument performance (Cohen 1988).

The internal construct validity of the instrument was tested using confirmatory factor analysis and LISREL 8.54. The comparative fit index (CFI) was calculated in this manner. Convergent validity testing was performed

via comparison of GDS scores and the relevant sub-dimensions of the WHOQOL-BREF with the WHOQOL-OLD module. Criterion validity was tested using multiple linear regression of the WHOQOL-OLD scores on WHOQOL-BREF general perceived QOL (first benchmark item of the WHOQOL-BREF "How would you rate your quality of life?"). Conventional statistical analysis was conducted using SPSS v.10.0 (Norosis 2002).

## RESULTS

In total, 54.5% of the study population were female and 60.5% self-reported being in poor health. Mean age of the participants was  $71.06 \pm 5.20$  years (Table 1).

The overall scale score was  $56.02 \pm 11.86$ . The highest domain score was for intimacy (14.48), followed by autonomy (13.35), and past, present, and future activities (12.95). All of the domain scores and the overall score revealed acceptable ceiling and floor effects ( $< 5\%$ ). On the other hand, Cronbach's alpha values, as a measure of the internal consistency of the domains, were satisfactory. The alpha value for the overall scale structure was 0.85, whereas all of the domains had alpha values  $> 0.7$ , except for the autonomy domain, which had an alpha value of 0.68 (Table 2).

Item-scale correlations corrected for overlap are presented in Table 3. The logic for this analysis is that each item was expected to have a higher correlation coefficient with its own domain, as compared with each of the other domains. All the items in 4 of the 6 domains had higher coefficients with their own scales, whereas 1 item in the autonomy domain (Item 11) and 1 item in the past, present, and future activities domain (items 19) had higher correlations with the other domain scores, as compared to the correlations with their own domains. Table 4 shows a summary of the item-scale correlations,

**TABLE 9.** Multiple linear regression of WHOQOL-OLD\* subscale scores on the WHOQOL-BREF\* perceived quality of life item (item no q1), (standardized beta coefficients).

Dependent Variables	Independent variables					
	Sensory abilities	Autonomy	Past, present, and future activities	Social	Death & Dying	Intimacy
WHOQOL-BREF item q1: How would you rate your quality of life (R2 = 32%)	-0.118	.014 (ns)	.262	.210	.030 (ns)	.161

All are significant at P = 0.05; ns: non-significant.

\*WHOQOL-BREF: World Health Organization Quality of Life Instrument-Short Version; WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module.

indicating scale success of the instrument. The symbol “2” refers to the percentage of items that correlated significantly stronger with their own scale (domain) and symbol “1” refers to the percentage of the items that were correlated with their own domain that other domains regardless of statistical significance. As such, the scale success is the measure of the percentage of the items coded as “1” and “2”. Scale success was very satisfactory for the overall scale and other domains (90%-100%).

The correlation matrix presented in Table 5 indicates that the sensory abilities domain score, and the death and dying domain score had weak relationships with the overall score. The remaining domain scores had satisfactory relationships with the overall scale score.

Confirmatory factor analysis, which was conducted as a measure of internal construct validity, revealed satisfactory construct with very high CFI values (Table 6). Table 7 probes the external validity of the scale. Poor health, being older, and being female were sub-categories that were expected to have low HRQOL scores. The results show that age was only sensitive to overall score and 2 domain scores (sensory abilities, and past, present, and future activities). Participants differ in gender for autonomy, social participation and intimacy domains, whereas self-reported health status was discriminated by overall score and all domains, except for death and dying, and intimacy.

Convergence of WHOQOL-OLD domain scores on WHOQOL-BREF domains was very satisfactory in general, except for the death and dying domain, which had low correlation coefficients with the social relationships and environmental domains of the WHOQOL-BREF. On the other hand, GDS score was significantly correlated with all of the domain scores, except the intimacy domain score of WHOQOL-OLD. The sensory abilities domain had the strongest correlation with GDS score (Table 8). On the other hand, the criterion validity

assessment presented in Table 9 shows that the regression WHOQOL-OLD scores on WHOQOL-BREF general perceived QOL (first benchmark item of WHOQOL-BREF: “How would you rate your quality of life?”). Table 9 shows that the WHOQOL-BREF first benchmark item score explained the variance in all WHOQOL-OLD domain scores, except the autonomy, and death and dying domains.

## DISCUSSION

The Turkish version of the WHOQOL-OLD module demonstrated good psychometric performance and its skewness was acceptable (< 1.00) for all items and domains. In contrast to the global WHOQOL-OLD data (Power et al. 2005), which showed considerable ceiling effects in the death and dying, social participation, and intimacy domains, and a series of generic instruments that were used to test HRQOL in older adults in the literature (COOP, SF-20, SF-36, SIP, AQoL, FSQ, HSQ-12 and NHP) (Haywood et al. 2005, Fitzpatrick et al. 1998, Streiner and Norman 2003) that showed high ceiling and/or floor effects, no ceiling or floor effects were observed (fewer than 20 %) in any of the domain scores in the Turkish field trial version of the WHOQOL-OLD module.

As a measure of the scale’s internal consistency, Cronbach’s alpha values were within an acceptable range, as suggested by Nunnally and Bernstein (1994). The item analysis presented in Table 3 shows good convergent/divergent ability of the individual items, except for 2 items: item 11 of the autonomy domain and item 19 of the past, present, and future activities domain. These 2 items had higher correlations with the other domain scores than with their own domain scores. The Cronbach’s alpha values for these 2 domains did not increase when they (items 11 and 19) were deleted, indicating that they both had a positive contribution to their domains (see Table 3 alpha

values when items are deleted). On the other hand, alpha values also increased when item 20 of the sensory abilities domain and item 9 of the death and dying domain were removed. This indicates that these 2 items had a weak contribution to their domains. As these 2 items had stronger correlations with their own domains than with the other domains, it is difficult to suggest how to reword these 2 items until considerably more data on the WHOQOL-OLD is tested in the field in future studies.

The correlation matrix of the domains presented in Table 5 indicates that 3 domains—autonomy, past, present, and future activities, and social participation—had correlation coefficients with overall score  $> 0.7$ . The sensory abilities, and death and dying domains had weak relationships with the other domains, whereas the autonomy domain score was strongly correlated with all the other domains, except the death and dying domain. The insufficiency of generic HRQOL instruments to respond to changes in hearing ability was reported by McArdle et al. (2005), indicating that disease-specific instruments (such as the Abbreviated Profile of Hearing Aid Benefit-APHAB and the Hearing Aid Handicap for the Elderly -HHIE) are more sensitive to sensory abilities than generic ones.

The concept of death is perceived quite differently in eastern populations than in those in the West. In contrast with the evaluation of death by western populations as a fortune no need to talk on, eastern populations accept death as a natural phenomenon (Alatlı 2001). In our focus group discussions older Turkish adults did not talk much about death and dying (Eser et al. 2005).

The relationships between domain scores, and those between domain scores and overall WHOQOL-OLD score show that the most important predictors of overall QOL in the elderly were autonomy, past, present, and future activities, and social participation. Table 9 shows that the variance in the self-rated overall QOL question (q1) of the WHOQOL-BREF was also explained satisfactorily (with higher beta values) by the social participation, and past, present, and future activities domains of the WHOQOL-OLD. Previous reports confirm that social interactions and independent living (autonomy) are strong determinants of HRQOL (Constança et al. 2003, Borg et al. 2006, Browne et al. 1994, Farquhar and Bowling 1993, Hellström et al. 2004, Borglin et al. 2006). On the other hand, the overall QOL question (q1) of the WHOQOL-BREF was poorly related with WHOQOL-OLD autonomy, and death and dying domain scores. These 2 domains also gave poor results in the Brazilian and Nor-

wegian WHOQOL-OLD validation studies (Fleck et al. 2006, Halvorsrud et al. 2008) and death and dying domain in Norwegian study (Halvorsrud et al. 2008). GDS score, as an estimation of depressive mood, was significantly correlated with all the WHOQOL-OLD domains, except the intimacy domain score (Table 8), whereas a very high correlation coefficient (0.55) was obtained for the sensory abilities domain score, indicating that sensory abilities are one of the best predictors of depressive mood in the elderly, which is consistent with the results of previous studies (Nunnally and Bernstein 1994, Mulrow et al. 1990, Dreer et al. 2007). The convergence of GDS score on WHOQOL-OLD domain scores was almost inverse in the Norwegian WHOQOL-OLD validation study (Halvorsrud et al. 2008): the worst correlated domain was “sensory abilities” where all others’ correlation coefficients are higher than ours. The results of that study might have been due to the difference in the perception of depression between these cultures or the potential performance of national GDS version.

Age, gender, and health status were used to assess the external (discriminant) validity of the instrument. In adult populations, HRQOL scores conventionally decrease with age and illness, and in women. All domain scores, except sensory abilities and dying domain scores, did not differ between age categories when we dichotomized age from 80 and over in a Turkish elderly population. This can be regarded as an expected result, as older persons lose their sensorial abilities and become closer to death when getting older. Similar global analysis results were reported (Power et al. 2005), indicating that only the sensory abilities domain score can be discriminated by  $<80$  and  $\geq 80$  years of age groups in favor of the former.

In addition, HRQOL scores did not differ according to gender, which is consistent with the results of the global WHOQOL-OLD study (Power et al. 2005). The responsiveness of the Turkish version of the WHOQOL-OLD to changing health status was perfect, except for the death and dying, and intimacy domain scores. This result for the death and dying domain is consistent with the findings of the Brazilian validation study as well (Fleck et al. 2006). The largest mean score differences were observed for the self-report health variable, for which with individuals reported themselves to be healthy or ill. Domain scores were significantly higher on all facets, including the death and dying domain score in the global WHOQOL-OLD study. The reason for this inconsistency between our results and the global study results, especially concerning the death and dying domain score, can be attributed to cultural differences between

Western populations and the Turkish population. As it was mentioned above, death and dying are conceptualized differently across cultures. A similar rationale can be given to intimacy as well. Intimacy has been covered under the concept of “respect to older persons” in Turkey, that makes intimacy a highly prevalent dimension in the Turkish population, which makes it difficult to differentiate low and high intimacy experiences of older adults. At least many of the older adults have no problem in regard to intimacy yet. The strong effect of intimacy on life satisfaction, with regard to relationships with children and friends, was also reported in a study from Greece (Efklides et al. 2003) that included older adults that were culturally similar to the elderly in Turkey.

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