Original Article

The Turkish Version of the Thyroid-Specific Quality of Life Questionnaire, ThyPRO: A Validity and Reliability Study

Neslihan Ilkaz, RN, MSc
University of Health Sciences, Gulhane Training and Research Hospital, Operating Room Service, Ankara, Turkey

Emine Iyigun, RN, PhD
Professor, University of Health Sciences, Gulhane Faculty of Nursing, Ankara, Turkey

Erkan Ozturk, MD
Associate Professor, Medicana International Hospital,Ankara, Turkey

Aydogan Aydogdu, MD
Associate Professor, University of Health Sciences Department of Endocrinology and Metabolic Diseases , Ankara, Turkey

Semih Gorgulu, MD
Professor, Tunalı Hilmi Cad. 112/7 Ankara, Turkey

Corespondence: Neslihan Ilkaz, RN, MSc, University of Health Sciences, Gulhane Training and Research Hospital, Operating Room Service,, Ankara, Turkey Email: neslihanilkaz@yahoo.com

Abstract

Background: Thyroid diseases are very common in our country and influence the quality of life of patients**.**
Aim: The aim of this study was to determine the validity andreliability of the Turkish version of The Thyroid-Specific Quality of Life Questionnaire (ThyPRO).
Methods: "ThyPRO Scale", "Data Collection Form For the Socio-Demographic and Medical Information of Patients", "Brief Disability Questionnaire" and "Hospital Anxiety and Depression Scale'' were applied to 204 patients who were diagnosed with non-toxic goiter, hyperthyroidism, hypothyroidism, goiter, nodular goiter, multi-nodular goiter, Graves' disease and non-goiter autoimmune hypothyroidism.
Results: Cronbach's α coefficient for the ThyPRO test and retest were found to be .95 and .95, respectively. According to the factor analysis 13 factors which constitute 61. 73% of the total variance were found.
Conclusion: The results of the study showed that ThyPRO is valid and reliable scale in Turkey.It is considered that ThyPRO scale is important in evaluating the quality of life of thyroid patients. It contributes their health status, effectiveness of the treatment and nursing care.

Key Word: Quality of life, Thyroid Disease, Validity, Reliability

Introduction

After the World Health Organization (WHO) defined the notion of health in 1948 as "not only not being sick but also being in good physical, mental and social moods," the notion of life quality has gained an increasing importance in the field of healthcare (Testa & Simonson,1996).

Life quality is defined as the fact that "the person perceives his/her place in life related to his/her goals, expectations, standards and personal interests within the frame of culture and values in which he/she lives" (*WHOQOL Group. Orley &Kuyken, 1994*, Carr, Gibson, & Robinson, 2001,Carr & Higginson 2001). Quality of life is an important factor in terms of evaluating the medical conditions and treatment efficiency of the individual (Musaoglu, 2008) and increasing the quality of nursing care. In addition to enabling the personal evaluation of patients, it also helps to provide information based on evidence related to the patient. Therefore, it is important to evaluate the quality of life of the

individual in the treatment and care period after the diagnosis period.

There are various scales that evaluate the life quality of individuals in our country. While these scales are generally related to the patients' general medical conditions, some were developed especially for those with a specific type of disease. The more important advantages of scales developed for a specific disease are that they can identify the smallest changes in life quality of the person and are more sensitive than scales developed for general medical conditions.

Thyroid diseases are very common in our country and in the world (Sencer, 2001). Thyroid gland diseases affect between 5% and 56% of our population and are common in areas with iodine deficiencies (Celik et al., 2008; Ozturket al., 2011). When there is a change in thyroid hormones, all cells and systems in the body can be negatively influenced (Burke, Mohn-Brown, & Eby, 2011; Oksel & Esen, 2010; Ozata, 2005a), dramatically affecting the quality of life those individuals.

A scale to evaluate the life quality of those with thyroid disease whose incidence is high is not available in our country. ThyPRO, a quality of life scale for patients with thyroid diseases, is a scale developed in Denmark to research the life quality of patients who are diagnosed with non-toxic goiter, hyperthyroidism, hypothyroidism, goiter, nodular goiter, multi-nodular goiter, Graves' disease, and non-goiter autoimmune hypothyroidism.

A Turkish validity and reliability study for this scale is important to eliminate its shortcomings among the Turkish population.

Study Aim: The aim of this study was to determine the validity and reliability of the Turkish version of The Thyroid-Specific Quality of Life Questionnaire (ThyPRO).

Methods

Design and sample

This was designed as a cross-sectional study.The research sample comprised 204 patients diagnosed with non-toxic goiter, hyperthyroidism, hypothyroidism, goiter, nodular goiter, multi-nodular goiter, Graves' disease, or non-goiter autoimmune hypothyroidism, with or without thyroidectomy, and who did not have thyroid or other cancer diagnoses.

All patients agreed to be included in the research. Retests were applied to 32 patients.

Ethical consideration

Before adapting the ThyPRO to the Turkish language and culture, we received, via electronic mail, permission from Watt et al. Moreover, required written permission was received from the education hospital's Ethics Committee.

Instruments

To gather data, the Thyroid-Specific Quality Of Life Questionnaire (ThyPRO), the Data Collection Form for Socio-Demographic and Medical Information of Patients, the Hospital Anxiety and Depression Scale, and the Brief Disability Questionnaire (BDQ) were administered.

Data Collection Form For Socio-Demographic and Medical Information of Patients:This form consist of 20 questions asked by the researcher to collect general patient information, such as prescription use and previousdiagnoses, 8 of which related to socio-demographic characteristics, and 12 of which related to medical features.

The Thyroid-Specific Quality of Life Questionnaire (ThyPRO): Developed by Watt et al., the ThyPRO, a valid and reliable instrument, was published in 2010 and comprises 84 questions covering 13 subscales. There is no total point scale for ThyPRO. Each subscale is scored between 0 and 100, and each question is answered on a five-point Likert scale from 0 (*never*) to 4 (*almost always*). A different score is calculated for each subscale. The score increases as the quality of life declines. The survey is completed in at least 15-20 minutes, and its test-retest reliability for all subscales was found to be greater than .70 (.77 to .89). A different correlation value is available for each subscale (Watt et al 2010).

Linguistic Validity of theThyroid-Specific Quality of Life Questionnaire (ThyPRO):

Before adapting the ThyPRO to the Turkish language and culture, we received, via electronic mail, permission from Watt et al. Moreover, required written permission was received from the the education hospital's Ethics Committee. For the adaptation of the language equivalence of the scale to the Turkish society, the scale was translated into Turkish by three experts, all specialized in the original language of the scale,

independently. After selecting the most appropriate expressions in the scales, the scale was translated back to English by two language experts who did not see the English original, who knew both languages and culture well, the native language was Turkish. Both translations were compared to English original. As a result of the evaluations reached a consensus. The intelligibility was evaluated by applying to 5 patients not included in the research sample. The necessary corrections were made in the direction of the suggestions and the scale was given the final shape.

In the ThyPRO, developed in Denmark, the patient groups expected to score higher or lower in the *goiter symptoms*, *hypothyroid symptoms*, and *hyperthyroid symptoms* subscales are categorized separately. The patient group expected to score higher in the *goiter symptoms* subscale includes those with non-treated non-toxic diffuse or multi-nodular goiter. The patient group expected to score lower in this subscale includes those with non-goiter autoimmune hypothyroidism. The patient group expected to score higher in the*hypothryoid symptoms* subscale includes those with hypothyroidism, whereas the group expected to score lower includes those withnon-treated non-toxic diffuse and nodular goiter. The patient group expected to score higher in the *hyperthyroid symptoms* subscale includes those with Graves' disease, nodular goiter, or hyperthyroidism, whereas the group expected to score lower includes those withnon-treated non-toxic diffuse and nodular goiter (Watt et al 2010). We categorized patients with thyroid diseases accordingly.

Brief Disability Questionnaire: Disability is defined as "depending on the physical and mental illness, inability to state an individual's work force," and it is a condition which hinders basic living activities (Druss, Marcus & Rosenheck et al., 2000; Ulug, Ertugrul, Gogus & Kabakcı 2001).

The BDQ is a short questionnaire developed by the WHO to evaluate social and physical disabilities. It is based on the questions relating to disability in the Brief General Health Scan Form and includes 11questions about physical and mental disabilities experienced in the prior month (Kaplan, 1995).

Its validity and reliability were shown by Kaplan in 1995. Kaplan found the Cronbach's α was .92. Disability is scored by the patients from 0 (*never*) to 2 (*always and all the time*). The total disability score is the sum of all the individual scores, totaling between 0 and 22. The score indicates no disability for scores ranging from 0 to 4, slight disability for scores ranging from 5 to 7, intermediate disability for scores ranging from 8 to 12, and severe disability for scores greater than 12 (Afsar, Yalcınsoy, Yakar, Bilgin & Akkaya, 2012; Er & Mollaoglu, 2011; Kaplan, 1995). We utilized the BDQ to evaluate the *impaired in social life and impaired daily life* subscales.

Hospital Anxiety and Depression Scale (HAD):Developed by Zigmond and Snaith in 1983, this is a self-evaluation used to determine the risk of anxiety and depression in patients with physical diseases, and it is applied people who come at the first level of healthcare service (Aydemir, 1997; Zigmond & Snaith, 1983). The aim of the scale was not to diagnose but to determine the risk, classified into groups, by scanning the anxiety and depression of patients with physical diseases. The validity and reliability of this scale was shown by Aydemir. It includes 14 questions in total and indicates anxiety if totaling an uneven number, but depression if totaling an even number. The questions are answered on a four-point Likert scale. As a consequence of studies carried out in Turkey, the minimum score for the anxiety subscale was found to be 10, whereas it was 7 for the depression subscale. Scoresranged from 0 to 21 (Aydemir, 1997). The reliability, as measured by Cronbach's α, was .8525 for the anxiety subscale and .7784 for the depression subscale. The overall correlation was between .8161 and .8547 on the anxiety subscale and between .7374 and .7795 on the depression subscale. Consequently, it was determined that the Turkish version could be used in a valid and reliable way (Aydemir, 1997; Kılınc & Torun, 2011). We used the HAD scale to determine anxiety and depression subscales.

Data Collection

The research was carried out beginning in January 2013 and ending in April 2013 in the General Surgery Department Clinic/Polyclinic and Endocrinology and Metabolism Diseases Department Clinic/Polyclinic at a teaching hospital. The patients who met the research criteria were selected by the researcher. All patients were informed about the aim of the study before data collection. Then, the data were

collected in face-to-face interviews. Patients were informed about retest in the first interviews, and their permissions and contact information were collected. For others, appointment dates were tracked, and they were retested after 3 to 5 weeks.

Statistical Analysis

We used MS Excel and SPSS for Windows version 15.00 (SPSS Inc. Chicago, IL, USA) for data and statistical analysis. Descriptive statistics are expressed in number (%) for discrete variables and in average ± standard deviationor intermediary (highest or lowest values), according to the circumstance, for continuous variables. Normality of distributions was evaluated using a single sample Kolmogorov-Smirnov test.

Accordingly, the Mann-Whitney test was utilized for intergroup comparisons and the Kruskal-Wallis test for comparisons of more than two groups. Changes in variables were evaluated using the Spearman correlation coefficient. At $p \leq .05$, a significant difference was recognized. The inner consistencies of the scales were evaluated using Chronbach's α and Principle Components Analysis was performed for factor analysis. After the Varimax rotation was performed, the data were divided into the factors in appropriate numbers.

Results

Almost all (91.7%) of the 204 participants were female. Most of them (74.5%) were married, and nearly all (91.2%) lived in cities. Most (71.6%) of the participants defined their income as average. Approximately half (51.0%) were housewives, and their average of age was 42.93 ± 13.74 years.

Table1.Cronbach's Alpha for the ThyPRO Subscales andResults of the Test-Retest Correlation Analysis

ThyPRO Scale	Test	Retest	Test-Retest	
General Cronbach's Value	**0.959**	**0.958**	**r***	**p**
Goiter Symptom Subscale	0.875	0.947	0.827	0.000
Hyperthyroid Symptoms Subscale	0.787	0.824	0.663	0.000
Hypothyroid Symptoms Subscale	0.667	0.653	0.594	0.000
Eye Symptom Subscale	0.797	0.862	0.768	0.000
Fatigue Subscale	0.806	0.839	0.725	0.000
Cognitive Problems Subscale	0.896	0.914	0.706	0.000
Anxiety Subscale	0.801	0.879	0.742	0.000
Depression Subscale	0.825	0.793	0.587	0.000
Emotional Subscale	0.812	0.768	0.670	0.000
Impaired Social Life Subscale	0.754	0.886	0.279	0.122
Impaired Daily Life Subscale	0.872	0.909	0.672	0.000
Impaired Sexlife Subscale	0.973	0.996	0.574	0.001
Cosmetic Complaints Subscale	0.795	0.926	0.548	0.001

*Spearman's Correlation Coefficient

Table 2 : ThyPRO Scale Factor Analysis

ThyPRO Scale Items	1	2	3	4	5	6	7	8	9	10	11	12	13
Felt discourage ?	.759												
Felt frustrated?	.759												
Felt unhappy?	.722												
Felt depressed(generally)?	.670												
Felt sad(generally)?	.632												
Felt ‘’ not like yourself’’?	.599												
Had mood swings?	.575												
Cried easily?	.566												
Noticed you easily felt stressed?	.518												
Had difficulty coping?	.473												
Felt discomfort swallowing?		.817											
Had difficulty swallowing?		.812											
Had the sensation of a lump in your throat?		.763											
Had the sensation of fullness in the neck?		.738											
Felt pressure in your throat?		.684											
Had the sensation of suffocating?		.621											
Had the need to clear your throat frequently?		.566											
Had a visible swelling in front of your neck?		.438											
Been hoarse?		.400											
Had difficulty finding the right words?			.778										
Had slow or unclear thinking?			.758										
Been confused?			.737										
Had difficulty concentrating ?			.693										
Had difficulty learning something new?			.688										
Had difficulty remembering?			.658										
Had dry skin?				.715									
Had itchy skin?				.672									
Had bags under the eyes or swollen eyelids?				.672									
Had the sensation of dryness or grittiness in the eyes?				.566									
Had swollen hands or feet?				.538									
Been very sensetive to light?				.517									
Had eye pain?				.516									
Had impaired vision?				.512									
Had moist or watery eyes?				.464									
Had an upset stomach?				.461									
Been sensetive to cold?				.314									
Limit your lessure activities or hobbies?					.730								
Not be able to participate in life around you?					.709								
Have difficulty around ?					.688								
Have difficulty managing your job ?					.661								
Have difficulty managing your daily life?					.617								
Feel as if everthing takes longer to do?					.613								
Have conflicts with other people?					.479								
Had double vision?					.286								
Felt that people in your surrondings have lacked understanding of your thyroid disease?					.278								
Felt in balance?						.797							

Had self-confidence?	.756							
Felt happy?	.699							
Felt in control of your life?	.694							
Been able to cope with the demands of your life?	.646							
Felt full of life ?	.605							
Felt energetic?	.495							
Had an increased appetite?	.335							
Felt angry?		.661						
Felt nervous?		.660						
Felt irritable?		.653						
Felt tense ?		.644						
Felt uneasy?		.505						
Felt pressure in or behind the eyes?		.493						
Felt afraid or anxious?		.430						
Have you been unsatisfied with your appearance because of your thyroid disease?			.841					
Have you tired to camouflage or mask visible signs of your thyroid disease (for example by wearing a scarf or sunglasses)?			.836					
Have you bothered by other people looking at you?			.816					
Has your thyroid disease affected your appearance (for example swelling of the neck, eye changes,weight changes)?			.772					
Has your thyroid disease influenced which clothes you wear?			.324					
Experienced palpitations (rapid heart beat)?				.699				
Had a tendecy to sweat a lot ?				.694				
Been sensitive to heat ?				.659				
Experienced shortness of breath?				.625				
Had trembling hands?				.571				
Been exhausted?					.753			
Been tired?					.734			
Felt worn out?					.653			
Had difficulty getting motivated to do anything at all?					.534			
Felt restless?						.580		
Have difficulty being together with other people (for example spouse, children, friends or others)?						.510		
Been concerned about being seriously ill?						.490		
Feel you were a burden to other people?						.466		
Feel your thyroid disease had a negative influence on your sex life?							.932	
Had a decrease sexual desire?							.920	
Had pain in your neck that could be felt in your ears?								.648
Had pain in front of your throat?								.623
Has your thyroid disease made you fell? too fat?								.373
Had loose stools?								.292

Table2 shows the results of factor analysis of the ThyPRO. Accordingly, the load factor in the correlation matrix was located above and below .30 in the table. The load factors of two substances were below .30. (The questions were, “Had double vision?” and “Felt that people in your surrounding have lacked understanding of your thyroid disease?

Table3. Score Comparisons of the Groups Expected High and Low Score on the Goiter Symptoms, Hyperthyroid Symptoms, and Hypothyroid Symptoms Subscales

Goiter Symptoms Subscale	Least- Most	p*
High	11.36 – 84.09	
Low	11.36 – 52.27	0.004
Hyperthyroid Symptoms Subscale	**Least- Most**	**p***
High	0.00 – 100.00	
Low	25.00 – 43.75	0.701
Hypothyroid Symptoms Subscale	**Least- Most**	**p***
High	0.00 – 93.75	
Low	0.00 – 100.00	0.002

*****Mann-Whitney U Test

Table4.The Expected Higher and Lower Scores for the *Impaired Social Life* and *Impaired Daily Life* Subscales from the ThyPRO Using BDQ

	Impaired Social Life Subscale		Impaired Daily Life Subscale	
Brief Disability Questionnaire	**($\bar{x}$ ± ss)**	**p***	**($\bar{x}$ ± ss)**	**p***
No Disability	9.6 ± 15.6		7.07 ± 11.7	
Mild Disability	17.4 ± 19.3		21.5 ± 19.1	
Medium Disability	17.3 ± 19.1	0.000	29.3 ± 21.7	0.000
Severe Disability	33.8 ± 26.9		48.2 ± 19.8	

***** Kruskal-Wallis Test

Table5. Expected Higher and Lower Scores for the *Anxiety* and *Depression* Subscales from the ThyPRO Compared to Those for the *Anxiety* and *Depression* Subscales from the HAD Scale

ThyPRO Anxiety Subscale			ThyPRO Depression Subscale		
HAD Points	**Anxiety**	**p***	**HAD Points**	**Depression**	**p***
High	38.8889	0.000	**High**	56.9444	0.000
Low	65.1042		**Low**	32.7765	

*Mann Whitney U Test

Table 6. Correlation Between the ThyPRO and Other Scales

		Hospital Anxiety and Depression Scale		
		Anxiety	Depression	Brief Disability Questionnaire
Goiter Symptom Subscale	**r***	-0.417	0.134	0.515
	p	0.000	0.057	0.000
Hyperthyroid Symptoms Subscale	**r***	-0.494	0.172	0.463
	p	0.000	0.014	0.000
Hypothyroid Symptoms Subscale	**r***	-0.429	0.202	0.325
	p	0.000	0.004	0.000
Eye Symptom Subscale	**r***	-0.369	0.160	0.304
	p	0.000	0.023	0.000
Cognitive Problems Subscale	**r***	-0.358	0.120	0.378
	p	0.000	0.000	0.000
Anxiety Subscale	**r***	-0.554	0.176	0.440
	p	0.000	0.012	0.000
Depression Subscale	**r***	-0.583	0.275	0.407
	p	0.000	0.000	0.000
Emotional Subscale	**r***	-0.596	0.278	0.375
	p	0.000	0.000	0.000
Impaired Social Life Subscale	**r***	-0.425	0.278	0.375
	p	0.000	0.000	0.000
Impaired Daily Life Subscale	**r***	-0.505	0.243	0.673
	p	0.000	0.000	0.000
Impaired Sexlife Subscale	**r***	-0.256	0.145	0.165
	p	0.000	0.039	0.018
Cosmetic Complaints Subscale	**r***	-0.286	0.174	0.355
	p	0.000	0.013	0.000
Fatigue Subscale	**r***	-0.431	0.162	0.436
	p	0.000	0.021	0.000

*Spearman's Correlation Coefficient

Seventy-six (37.3%) of the participants had hypothyroidism, and 58 (28.4%) had nodular goiter. About half (51.5%, n = 105) stated they were diagnosed with thyroid disease 10-12 months prior. Most of the patients (71.1%) have no history of thyroid surgery

Table1 shows that the overall Cronbach's α for the ThyPRO is .959 for the test and .958 for the retest. Cronbach's α value were calculated for all subscales, and except for the *hypothyroid symptoms* subscale, all were between .75 and .97.

As a result of non-parametric tests, we determined that all the subscales were consistent with the test and retest results at a statistically significant level. Only the correlation for the *impaired social life* subscale was not significant (p> .05).

Accordingly Table 2, the factor loading in the correlation matrix was located above and below .30. The load factors of two substances were below .30. (The questions were, "Had double vision?" and "Felt that people in your surrounding have lacked understanding of your thyroid disease?")

The groups of patients expected high or low score on the *goiter symptoms*, *hyperthyroid symptoms*, and *hypothyroid symptoms* subscales are shown in Table3 with their actual scores. The scores for *goiter symptoms* and *hypothyroid symptoms* subscales are statistically higher or lower as expected (p< .05), but this was not true for the *hyperthyroid symptoms* subscale (p> .05)

The impaired daily life and social life subscales of the Thy PRO were evaluated according to the BDQ (Table 4). Patients with severe disabilities had average scores for these subscales that were higher than those of others (those with no disability, mild disability, or medium disability scores), and this was found to be statistically significant.

The low score indicated that anxiety level was high in the anxiety subscale of the HAD scale (Table 5). These groups' scores were found high in the anxiety subscale of the ThyPRO. The

difference between the groups was statistically significant ($p < .05$).

ThyPRO subscales were compatible with the HAD Scale and the BDQ, as shown in Table 6. A statistically significant negative relationship was found between the anxiety and impaired daily life subscales of the ThyPRO and the anxiety subscale of the HAD scale ($p < .05$ and $r > .500$). A statistically significant positive relationship was found between the impaired daily life subscale and the BDQ ($p < .05$ and $r > .500$).

Discussion

Comparison of Participant Characteristics

Increasing age, an increase in the incidence of thyroid diseases emerges. According to quotations by Naharcı and Doruk (2012) from the study Gambert and Miller (2004), nodule evolution on thyroid glands was related to increasing age. In addition, an increase in lymphocytes is seen with fibrotic tissue evolution (Naharcı & Doruk, 2012). In this study oldest patient was aged 80 years, whereas the youngest was aged 18 years. The patients with thyroid have high age average in the literature (Braverman, 1994; Ozata, 2005a, Burke, Mohn-Brown, & Eby, 2011). In this study, the average age of the patients with thyroid is found to be high, complying with the findings in the literature (DeRuiter 2002, Ozata 2005a, Karakodovan, & Eti Aslan 2010, Burke, Mohn-Brown, & Eby, 2011).

The incidence of thyroid insufficiency is 8 to 10 times higher in women than men. Women who are pregnant, postnatal, and in menopause, are at risk for thyroid diseases (Ozata, 2005b).Women life span is longer than men. Therefore, they are exposed to more chronic diseases like thyroid diseases. (Dogan et al 2011; Ozata, 2005b; Yazıcı, Yagcı, & Ataoglu, 2004). As seen in the literature, we found our study sample to be nearly exclusively (91.7%) women.

Validity and Reliability of the ThyPRO

The reliability of the Turkish version of the ThyPRO was evaluated using Cronbach's α. Generally, when Cronbach's α. exceeds .70, reliability is shown. Cronbach's αto be greater than .90 is more perfect (Turan, 2012).

The Cronbach's α value acquired for the entire scale of the Turkish version was found to be .95 in this study. This shows that the scale is highly consistent and reliable. The overall Cronbach's α for the Denmark version is greater than .70 (Watt et al., 2008).

When the Cronbach's α was determined for the test-retest results of the Turkish version, all were greater than .70 (.75 to .97) except for the *hypothyroid symptoms* subscale (Table 1). These findings show that the reliability of the Turkish version is rather high. Test-retest values for Chronbach's α for the hypothyroid symptoms subscale was .66. While this value is below .70, it is stated that the value is not that low for reliability.

Correlations determine the direction, magnitude, and importance of a bivariate relationship between two or more variables (Turan, 2012). The Turkish version of the ThyPRO was evaluated for test-retest correlations of all the subscales (Table 1). We found that every subscale, except the *impaired social life* subscale, was correlated ($r > .500$; range, .548 to .827) and significantly so ($p < .05$). Correlation values were found for the Denmark version was above .500 (range, .70 to .89) for all subscales (Watt et al., 2010). We found correlation values that were lower, but this might be a result of the number of participants in our study (204 versus 907; Watt et al., 2010). We found test-retest correlation values to be greater than .500 and to be below $p < .05$ are indicated significance.

We found test-retest correlation values were lower in the *impaired social life* subscale ($r = .27$), but this was not significant ($p > .05$; Table 1). The test-retest correlations for the *impaired social life* subscale in the Denmark version was .84 (Watt et al., 2010). Our results were not consistent with those found in the literature. Impaired social life influences an individual's quality of life. The concept of quality of life may vary depending on the person's perception and energy; therefore, when the questions are asked again, the individual's answers can change according to their mood at the time (Carr, Gibson, & Robinson, 2001). The perception of social life may change over time for this reason.

As the ThyPRO was used for the first time in our country, factor analysis was performed using scores determined at the end of the study. Factor analysis is a statistic performed for defining a small number of significant variables from a wide range of variables that measure the same structure. Structural validity of the tools used to measure a property can be evaluated using factor analysis (Buyukozturk, 2002). To provide the

factorization, correlation values should range between .30 and .90; the values should not be under 0.30 (Alpar 2012).

An exploratory factor analysis resulted in the identification of 13 subfactors in this study (Table 2). This finding explains 61.73% of the scale and indicates that the content reliability of the Turkish version was high. We found out that this complies with the Denmark version (Watt, 2008; Watt et al., 2010). The loaded factors of these items were greater than .30. The items related to emotions, depression, thyroid diseases, cognition, daily life, cosmetics, hyperthyroidism, tiredness, and sex life are categorized under the same group. This finding is compatible with the Denmark version. Consequently, grounds for validating the scale are present.

We believe that the items with load factors less than .30 (where the questions were, "Had double vision?" and "Felt that people in your surrounding have lacked understanding of your thyroid disease?") were not understood by the patients, and was re-evaluated in terms of Turkish grammar. Some studies found that visual impairment influences anxiety, daily lives, and social lives as well as quality of life (Gutierrez et al, 1997). Therefore, we believe these questions are related to the items included in the *impaired daily life* subscale. Hence, they are evaluated so that the internal reliabilities of these items are not low and should be used in accordance with the original scale.

Some standard scales are used to assess the ThyPRO subscales. The HAD scale was used to evaluate the *anxiety* and *depressi*onsubscales of the ThyPRO; the BDQ was used to evaluate the *impaired social life* and *impaired daily life* subscales. Evaluation of the *hyperthyroid symptoms*, *hypothyroid symptoms*, and *goiter symptoms* subscales was performed according to the ThyPRO criteria. For those subscales that do not have golden standards, the construct validity was evaluated using factor analysis, and internal reliability was evaluated using Cronbach's α. The correlations between test-retest values were used to evaluate reliability.

We evaluated the expected low and high scores for the *goiter symptoms* subscale (Table 3). Patients who were expected to score high included those who were untreated non-toxic diffuse or multi-nodular goiter. Patients who were expected to have low scores included those with non-goiter autoimmune hypothyroidism. Minimum-maximum scores obtained in those two patient groups are shown. Differences between these scores were statistically significant ($p< .05$; Table 3).In this context, the Turkish version of the ThyPRO was found to be sufficient for measuring the symptoms of goiter patients.

Patients expected to score high on the *hypothyroid symptoms* subscale were those with hypothyroidism, whereas those expected to score low were those who were untreated for non-toxic diffuse goiter and nodular goiter according to ThyPRO criteria. Minimum-maximum scores obtained in those two patient groups are shown. The differences were significant (Table 3). Therefore, the Turkish version of the ThyPRO was found to be sufficient in measuring the symptoms of hypothyroid patients.

Patients expected to score high on the *hyperthyroid symptoms* subscale were those with Graves' disease, nodular goiter, and hyperthyroidism, whereas those expected to score low were those with untreated non-toxic diffuse goiter and nodular goiter according to ThyPRO criteria (Table 3). Minimum-maximum scores obtained in those patient groups were evaluated, and no statistically significant difference was found ($p> .05$). The differences were significant in Denmark version. Our results differ as a result of the major numerical differences between the two patient groups.

ThyPRO versus the Other Scales

The BDQ was used with geriatric patients aged more than 65 years, with Multiple Skleroz (MS) patients with ankylosing spondylitis, and with patients with alcohol dependence (Er & Mollaoglu, 2011;Eren et al., 2007, Solmaz, 2008). Studies on ability loss are rare in the literature, but many will agree that it affects those with chronic diseases. We evaluated *impaired social life* and *impaired daily life subscales* of ThyPRO using the BDQ. The relationship was statistically significant (Table 4).Within this frame, the *impaired social life* and *impaired daily life* subscales of the ThyPRO are sufficient in evaluating these aspects of individuals.

Increased anxiety negatively affects quality of life (Afsar, Yalcınsoy, Yakar, Bilgin & Akkaya, 2012;Aydemir, 1997; Gulseren, Hekimsoy, Gulseren, Bodur &Kultur 2001;Koroglu, Corapcıoglu, & Kalender, 2003). Scores taken

from the *anxiety* subscale of the HAD scale were compared with those taken from the *anxiety* and *depression* subscales from the ThyPRO (Table5). If patients have low scores from the anxiety subscale of HAD, they have high scores from the anxiety subscale of ThyPRO. Due to a low score on the HAD, anxiety subscale means high anxiety levels. Therefore his/her life quality is low. Within this frame, the individual is expected to score high on the *anxiety* subscale from the ThyPRO. Table 6 shows a negative statistically significant relationship between the anxiety subscale of HAD and the anxiety subscale of ThyPRO (r> -.554, p< .05). The *anxiety subscale* from the ThyPRO was found to be sufficient for evaluating the conditions of individuals with thyroid disease.

Usually, there is no complaint in patients with goiter. When the goiter enlarges enough to put pressure on the esophagus, it may cause problems such as coughing and asthma. When it progresses to thyroid stimulating hormone will decrease, which may cause symptoms for patients with hypothyroidism (Özata, 2005b). Easy fatigue, exhaustion, and lack of energy are among the symptoms that can affect a person's daily activities and social life. When the correlations between ThyPRO and other scales were examined (Table6), there were positive and statistically significant relationships between the *goiter symptoms* subscale of ThyPRO and the BDQ (r>.515,p< .05). Increasing disability is influenced quality of life of goiter patients. Within this frame, the *goiter symptoms* subscale of ThyPRO is sufficient in evaluating the life quality of goiter patients.

Daily life activities are activities such as enabling environmental safety, communication, eating, drinking, urination, personal cleaning, and moving (Goverover, O'Brien, Moore & DeLuca, 2010) for healthy individuals to sustain life. In correlating the *impaired daily life* subscale of ThyPRO with the BDQ, a statistically significant positive relationship was found (r> .500, p< .05; Table 6).

Limitations

From the moment ThyPRO was published, no publication certifying that it was used in other studies was encountered; therefore, discussion of its reliability and validity was limited to published statistical data of the ThyPRO. Because the ThyPRO has no total scale score, no discussion can be addressed regarding its total scale score. Absence of the cut-off value for ThyPRO scale caused difficulties in evaluating quality of life of the participants. Because there is no golden standard test for some subscales, content validity and reliability of these subscales were evaluated.

Conclusions

The Turkish version of ThyPRO was found to be valid and reliable in evaluating the treatment and care of thyroid patients in our country. A shorter form of the scale is considered because it would be helpful for the practical use of the scale.

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