

Comparison of SF-36 and WHOQOL-100 life quality scales in early period tuberculosis subjects

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Abstract

Objective: To determine the quality of life levels of early-period tuberculosis subjects by using the Short Form-36 and World Health Organisation's Quality of Life-100 scales and to compare the similar fields of the two scales.

Method: The cross-sectional research, including 92 active tuberculosis subjects, was conducted from January 2007 to January 2008 at the Ministry of Health and Research's Sanitorium in Kayseri, Turkey. The two standard formats and a survey form developed by the authors were used as a means of data collection. The Bland-Altman method was used to determine the adaptation of standard protocols in physical, social and psychological functions, general health perception, pain and vitality areas. SPSS version 15 was used for data analysis.

Results: As a result of applied correlation analysis, a positive significant, but moderate, common relation was found between the two scales as regards similar subfields (physical function $r=0.391$, general health perception $r=0.436$, social relations $r=0.411$, and spiritual health $r=0.546$) ($p < 0.001$). The subgroups of the scales Cronbach-Alfa reliability coefficient were observed to vary between 0.63 to 0.94. The adaptability of the two scales was observed under physical, social and psychological functions, general health perception, pain and vitality/energy subfields by the Bland-Altman method.

Conclusion : Our study revealed the fact that there was adaptability between similar subfields of the two standard protocols in early-period tuberculosis subjects.

Keywords: Life quality, Scales, Comparison, Adaptation of similar areas. (JPMA 62: 1161; 2012)

Introduction

The World Health Organisation (WHO) defines health as not only absence of disease and disability, but also complete physical, psychological and social welfare. Tuberculosis patients face physical restrictions as well as various psychological, economical and social problems. It is a known fact that the existence of these problems impairs the life quality of TB patients.¹⁻³ It is also known that the long duration of TB treatment and the short-term and long-term side effects of the prescribed medicines are among factors that affect the quality of life negatively.^{2,3} It has been reported in several studies that symptoms related to the disease, difficulties experienced in receiving health services, the side effects of drugs, longlasting treatment, inadequate social support systems and economic restrictions are among the factors that impair the quality of life of TB patients.^{1,4} Life quality has been defined as a multidimensional concept reflecting individual general health, including psychological, social and

physical conditions.⁵ The WHO defines quality of life (QoL) with regard to health as the way individuals perceive themselves within their own culture and value systems.⁶ Hundreds of scales are used to measure life quality. Life quality scales are mainly classed in two groups as general and specific concept scales.⁷ SF-36 (Medical Outcomes Study 36-item Short-Form Health Survey) is a general concept scale widely used in the measurement of tubercular patients' life quality.¹ General concept scales are planned to be adapted to all sections of society, dissimilar medical enterprises, diseases in general and individual cases. Since these scales cover physical, mental and social dimensions, their suitability to the disease to be studied has to be tested.⁸ It has been stated in a large number of studies that SF-36 is suitable to measure the life quality of TB patients. Earlier studies⁹ have reported SF-36 as a convenient scale to assess the life quality of pulmonary TB patients. Others have indicated that both SF-36 and EuroQOL EQ-5D scales were reliable after

investigating their reliability and validity in 186 TB patients.¹⁰ However, in these studies their consistency was not evaluated to determine whether SF-36 was suitable specifically for early patients in the period of active TB. Advanced psychometric tests are required to assess the consistency of other scales in the QOL measurement of TB patients. The general concept life quality WHOQOL-100 method, which is one of these scales, emerged from the need to develop an international scale and an integrated approach in health and health services.¹¹ Until now, no study has been conducted in which the WHOQOL-100 scale was used to assess the life quality of TB patients.

This study was conducted to determine the QoL in early-period TB subjects by implementing the SF-36 and WHOQOL-100 scales; to investigate the adaptability of the common subfields these scales (physical, social and psychological function, general health perception, pain and vitality/energy) by comparing them using the Bland-Altman method; and to investigate the consistency state of these scales for early-period TB patients.

Patients and Method

The cross-sectional research comprising 92 active TB in-patient subjects aged 18 or over was conducted between January 2007 and January 2008 at the Ministry of Health and Research's sanatorium in Kayseri, Turkey. A survey form developed by the researchers and the SF-36 and WHOQOL-100 scales were used for data collection.

Quality-of-life instruments are classified as general health or specific-condition surveys. The SF-36 scale is used as a general health-based survey of quality of life.¹² The SF-36 is a generic measure used as opposed to quality of life scales that target a specific age, disease, or treatment group.¹³ The SF-36 scale was developed to be used in clinical practice and research, health policy assessment, and general population surveys. SF-36 contains 8 domains consisting of 36 items: physical functioning (PF) (10 items); role limitations due to physical health problems (RP) (4 items); bodily pain (BP) (2 items); general health (GH) (5 items); vitality/energy (VT) (4 items); social functioning (SF) (2 items); role limitations due to emotional problems (RE) (4 items); and mental health (MH) (5 items). It also includes an item that provides an indication of perceived change in health. For each scale, 0 (the worst health condition measured) to 100 (the best health condition measured) was calculated.¹⁴ The Standard SF-36 questions focus on the preceding weeks.¹⁵ The reliability and validity

of the scale for Turkish people have already been tested.¹⁶

The WHOQOL-100 is a generic measure established to be used for a wide spectrum of psychological and physical disorders.^{17,18} It is a multidimensional, multilingual profile for subjective assessment. The 100 items are organised in 25 facets, including six domains: physical, psychological, social relationships, environment, independence, and spiritual. It also includes one facet covering overall QOL and general health. High scores indicate good QOL. Respondents answer questions about their quality of life over the preceding two weeks.¹⁹ The reliability and validity of the scale for Turkish people have also been established.²⁰ The Turkish version of WHOQOL-100 has three extra questions on social impression. All participants were informed and written consent was obtained from each of them. The study was approved by the Research Ethics Council of Erciyes University, Kayseri, Turkey.

Statistical analyses were performed by using SPSS version 17.0. Data were indicated as mean and standard deviation ($X \pm SD$) or median with minimum-maximum values. $P < 0.05$ values were considered to be significant. For internal consistency of response, the SF-36 and WHOQOL-100 scales were assessed by using Cronbach's Alpha for the domains. Floor and ceiling effects, which are possible QoL scores for SF 36 and WHOQOL-100, were the calculated parameters of sensitivity. Pearson's correlations were used to determine the level of agreement between two like subscales of the two instruments. R² was used to express the percentage of variance for independent lability to dependent lability. The adaptability of similar domains (physical, social and psychological functionings, general health perception, pain and vitality) between SF-36 and WHOQOL-100 was analysed by using Bland-Altman plots. Bland and Altman proposed researchers apply two methods on a group of participants, then plot the different scores against the mean for each participant.²¹ In the Bland-Altman method the ratios between the two techniques are plotted against the mean of the two techniques. The Bland-Altman method accounts for the mean difference between two methods of measurement (the bias), and they agree on 95% as the mean difference (± 1.96). It is anticipated that the 95% limits consist of 95% of the differences between the two measurement methods.²²

Results

Of the 92 early-period TB in-patient subjects, 62

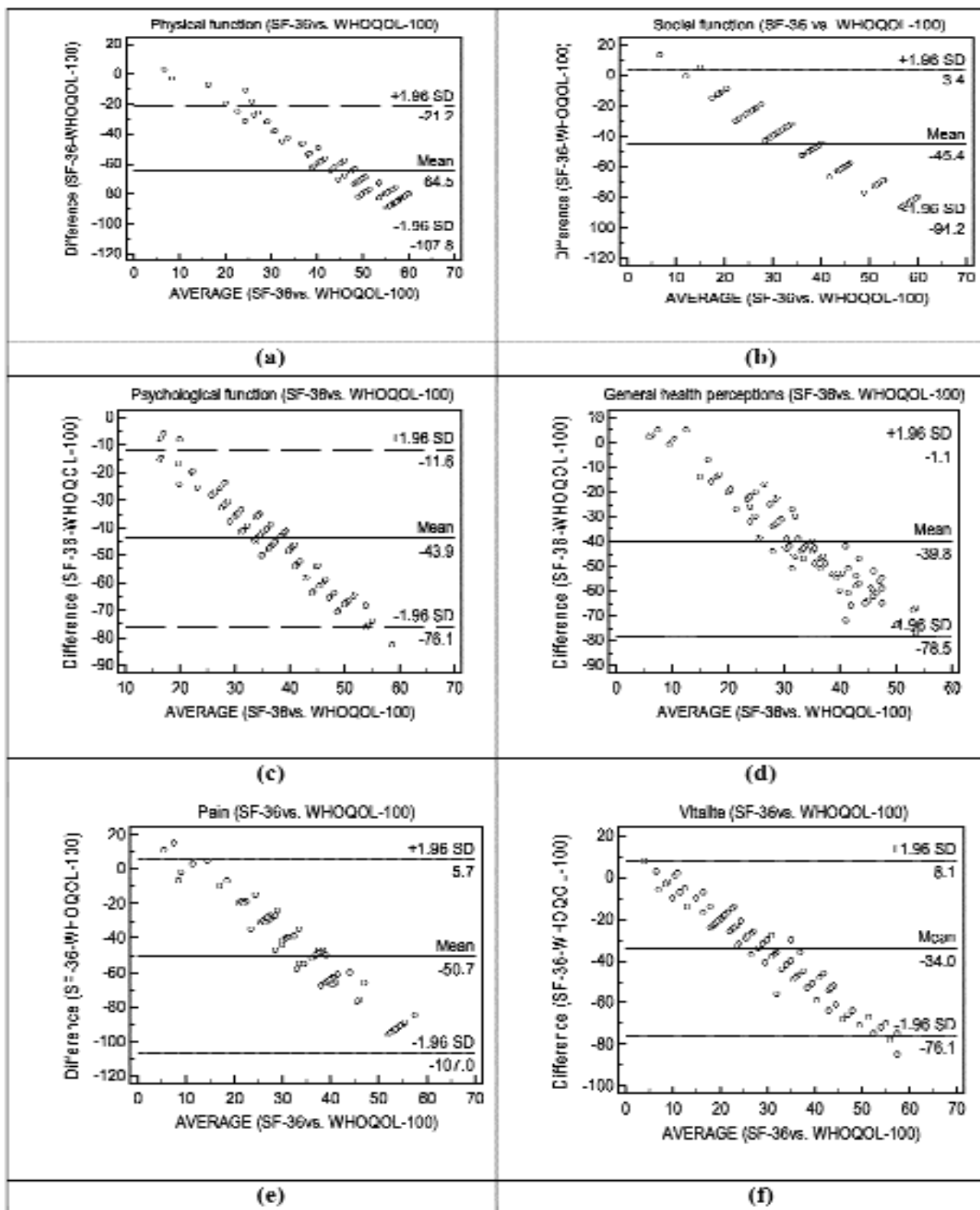


Figure: Bland-Altman plots have 6 different subfields in accordance with a specific area: a) Physical functioning (SF- 36) and physical health (WHOQOL-100). b) Social functioning of SF-36 and social relations area of WHOQOL-100. c) Mental health of SF-36 and psychological area of WHOQOL-100. d) General health perception of SF-36 and general QOL of WHOQOL-100. e) Pain of SF-36 and pain of WHOQOL-100. f) Vitality of SF-36 and vitality of WHOQOL-100. Horizontal lines are drawn at the mean difference, and at the limits of agreement ± 1.96 SD. The dotted lines indicate the upper and lower limitation of the 95% reliability gap ($ave \pm 2SD$) and the dashed line the bias.

Table-1: Demographic features.

Variance	n	%
Gender		
Female	30	32.6
Male	62	67.4
Mean Age (years)	36.5±16.8 (15-78)	
Monthly income (mean)	355 YTL	
Range	(150-2000)	
Marital status		
Single	25	27.2
Married	62	67.4
Widow-cr/divorced	5	5.4
Education		
Illiterate	11	12
Primary	39	42.4
Secondary	13	14.1
High school	25	27.4
University	4	4.3
Occupation		
Freelance	26	28.3
Housewife	26	28.3
Employee	16	17.4
Unemployed	15	16.3
Retired	9	9.8
Total	92	100

YTL: Turkish Lira.

(67.4%) were male, while 20 (32.6%) were female (Table-1).

In the SF-36 scale, the subjects obtained the lowest score from physical role restrictions (28.5±38.3), and the highest from the physical function dimension (78.1±23.1). In the WHOQOL-100, they obtained the lowest score from the general QOL area, and the highest from the spirituality area (15.3±3.3). Within the study, the floor effect was found at 1.1-56.5% in the SF-36, and at 1.1-1.1% on the other scale. The ceiling effect was found at 1.1-24.9% in the former scale and at 1.1-8.7% in the latter. The Cronbach-Alpha reliability coefficient of the scales subgroups varied between 0.63 to 0.94 (Table-2).

As a result of applied correlation analysis, a positively significant but moderate relation was found between the two scales' similar subfields (physical function $r=0.391$; general health perception $r=0.436$; social relations $r=0.411$; and spiritual health $r=0.546$) ($p < 0.001$) (Table-3). The correlations of the two scales' subgroups were found to be between $R^2=0.000004$ and 0.42.

It was found that the two scales had good adaptability in the physical, social and psychological functions, general health perception, pain and

Table-2: Analysis of subscales of SF-36 and WHOQOL-100 life quality scales.

	X ± SD	Median	Floor (%)	Ceiling (%)	Cronbach's Alpha
SF 36					
Physical Functioning	78.1 23.1	85.0	5(1.1)	100(21.7)	0.90
Physical Role Limitation	28.5 38.3	0.00	0.0(56.5)	100(14.1)	0.87
Pain	61.0 26.9	62.0	0.0(2.2)	100(20.7)	0.81
General Health Perception	52.6 21.0	55.0	5(3.3)	92(1.1)	0.94
Energy/ Vitality	46.0 23.8	40.0	0.0(1.1)	100(1.1)	0.82
Social Functioning	59.4 25.9	62.5	0.0(1.1)	100(14.1)	0.72
Emotional Role Limitation	50.4 38.1	33.3	0.0(23.9)	100(24.9)	0.63
Mental Health	58.1 17.7	60.0	20(2.2)	92(3.3)	0.72
WHOQOL-100 Domain					
Physical Health	13.6 2.9	13.3	7.0(1.1)	20(1.1)	0.64
Psychological Health	14.2 2.6	14.3	7.8(1.1)	19.6(1.1)	0.74
Level of Independence	13.0 3.6	13.3	4.8(1.1)	20.0(1.1)	0.76
Social Relationships	14.0 2.8	14.0	7.0(1.1)	20(1.1)	0.72
Environment	13.0 2.8	12.9	7.63(1.1)	19.4(1.1)	0.87
Spirituality	15.3 3.3	16.0	6.0(1.1)	20.0(8.7)	0.89
General QOL	12.8 3.5	13.0	5.0 (1.1)	20.0(2.2)	0.87

SF: Short form-36 Health Survey. WHOQOL-100: World Health Organisation Quality of Life-100 Scale.

Table-3: The correlations between subscales of the SF- 36 and WHOQOL-100 scales.

WHOQOL-100	SF-36 Domain															
	Physical Functioning		Physical Role Limitation		Pain		General Health Perception		Energy/Vitality		Social Functioning		Emotional Role Limitation		Mental Health	
	r	R ²	r	R ²	r	R ²	r	R ²	r	R ²	r	R ²	r	R ²	r	R ²
Physical Health	r=0.391 p<0.001	0.15	r=0.417 p<0.001	0.17	r=0.456 c p<0.001	0.21	r=0.529 c p<0.001	0.28	r=0.572 c p<0.001	0.33	r=0.423 c p<0.001	0.18	r=0.388 b p=0.003	0.15	r=-0.534 c p<0.001	0.29
Psychological Health	r=0.345 b p=0.001	0.12	r=0.286 b p=0.006	0.08	r=0.244 a p=0.019	0.06	r=0.471 c p<0.001	0.22	r=0.453 c p<0.001	0.21	r=0.371 c p<0.001	0.14	r=0.307 b p=0.003	0.09	r=-0.546 c p<0.001	0.3
Level of Independence	r=0.478 c p<0.001	0.23	r=0.428 c p<0.001	0.18	r=0.100 ns p=0.342	0.01	r=0.647 c p<0.001	0.42	r=0.580 c p<0.001	0.34	r=0.484 c p<0.001	0.23	r=0.385 c p<0.001	0.15	r=-0.313 b p=0.002	0.1
Social Relationships	r=0.273 b p=0.009	0.02	r=0.408 c p<0.001	0.17	r=0.192 ns p=0.067	0.04	r=0.409 c p<0.001	0.17	r=0.452 c p<0.001	0.2	r=0.411 c p<0.001	0.17	r=0.347 b p=0.001	0.12	r=-0.494 c p<0.001	0.24
Environment	r=0.147 ns p=0.176	0.02	r=0.279 b p=0.007	0.08	r=0.291 b p=0.005	0.08	r=0.318 b p=0.002	0.1	r=0.301 b p=0.004	0.09	r=0.431 c p<0.001	0.19	r=0.211 a p=0.044	0.04	r=-0.552 c p<0.001	0.3
Spirituality	r=0.031 ns p=0.770	0.001	r=0.002 ns p=0.987	0.000004	r=-0.130 ns p=0.218	0.02	r=-0.010 ns p=0.924	0.0001	r=0.010 ns p=0.927	0.0001	r=-0.107 ns p=0.308	0.01	r=0.043 ns p=0.684	0.002	r=-0.110 ns p=0.298	0.01
General QOL	r=0.259 a p=0.013	0.07	r=0.230 a p=0.027	0.05	r=0.319 c p<0.001	0.1	r=0.436 c p<0.001	0.19	r=0.375 c p<0.001	0.14	r=0.451 b p=0.001	0.2	r=0.315 b p=0.002	0.1	r=-0.587 c p<0.001	0.34

ns non-significant at p<0.05 level, a p<0.05, b p<0.01, c p<0.001 based on Pearson correlation coefficient, numbers are correlation values, physical functioning (SF- 36) and physical health (WHOQOL-100), social functioning of SF- 36 and social relations area of WHOQOL-100, mental health of SF- 36 and psychological area of WHOQOL-100, General health perception of SF- 36 and general QOL of WHOQOL-100, pain of SF- 36 and pain of WHOQOL-100, energy/vitality of SF- 36 and vitality of WHOQOL-100. Numbers in bold are the correlation coefficients between similar subscales of the two scales.

SF: Short form-36 Health Survey, WHOQOL-100: World Health Organisation Quality of Life-100 Scale.

vitality/energy subfields using the Bland-Altman method (Figure-1 a-f).

Discussion

It was indicated in our study that active TB patients obtained the lowest score from the physical role restriction dimension and the highest from the physical function dimension in SF-36, while the lowest score was obtained from the general health perception area and the highest from the spirituality area in the WHOQOL-100. An earlier study comparing active TB patients with the general population by using SF-36, reported that the PF,RP,GH; BP and VT scores of TB patients were low, but the RE, SF and MH subscales had no significant difference.²³ The physical health subscale was generally affected more than the mental health subscale. Other studies^{10,24} found active TB patients' SF-36 PCS scores to be significantly low compared to LTBI patients and previously-treated TB patients, but not their MCS scores.^{10,23} Others found the scores of active TB patients in all subscales of SF-36 to be significantly low compared to healthy people.⁹ The most affected subscales were RP and RE. Two studies compared latent tuberculosis infection (LTBI) and active TB patients, and found that the score of active TB patients in all SF-36 subscales were significantly low.^{25,26} Another study²⁷ found that active TB patients' all subscales of SF-36 were significantly low compared to inactive subjects and healthy people. It was found that the life quality of active patients was negatively affected more often in the physical role limitation and general health perception areas. The WHOQOL-100 findings in our study, which assessed quality of life of active TB patients, are the first to be reported in scientific literature. In active TB, the long duration of potentially toxic effect of the medicines used in treatment cause a decline in the quality of life.²⁸

It was determined in our study that the Cronbach-Alpha reliability coefficient of the scales varied between 0.63 to 0.94. Earlier studies found SF-36 inconsistency in responses to be remarkably high when compared with summary scales 0.88-0.92, and different areas 0.73-0.94 in three interviews.¹⁰ Others applied the Chinese version of SF-36 to the general population in China and in active TB patients and found the Cronbach-Alpha reliability coefficient to be between 0.88 to 0.97 for the eight subscales of SF-36.²³

As a result of applied correlation analysis in our study, a positively significant, but moderate relation between the similar subfields of the two scales was found in physical function (r=0.391), general health perception (r=0.436), social relations (r=0.411), and spiritual health (r=0.546) (p< 0.001).

The correlation between SF-36 and WHOQOL-100 scores was similar to reported findings for other diseases.²⁹ The correlation between SF-36 summary scores Physical component summary and Mental component summary (PCS and MCS) and 4 criterion means (SF-6D, HUI-2, HUI-3 and VAS) was tested earlier.²⁶ For the SF-6D scores, a strong correlation (0.79,0.80) was found with both PCS and MCS; for the HUI-2, HUI-3, and VAS scores (0.37, 0.48, and 0.59) from MCS was found a stronger correlation of PCS (0.59,0.66, and 0.67). In other studies,^{10,24} it was observed that SF-36 scores had a mean correlation with EQ5D Health related QoL questionnaire and VAS scores but a lower one with SG scores. Literature states that all of the SF-36 scores of the patients studied had a good correlation with the Quality of Life Index (QLI) shown by physicians and Karnofsky Performance Status (KPS) with 0.78 and 0.89 respectively, but it was not stated what type of correlation coefficient was used in calculation.⁹

In our study, a large floor (56.5%) and large ceiling effect (24.5%) for SF-36 was observed, but there was no floor or ceiling effect for the WHOQOL-100 (1.1 5 and 8.7% respectively). In the literature, the scales were shown to have a few problems in determining the floor and ceiling effect in several studies when different scales were used for TB patients.^{10,24,26} Although these problems emerged in practice with TB patients, some positive sides of these instruments were also stated. For instance the scales indicated a sound correlation with SF-36 responses.^{10,24,26} A study²⁶ stated that among SF-6D, Health Utilities Index Mark 2 (HUI-2), Health Utilities Index Mark 3 (HUI-3) and VAS good adaptability was observed by using ICC. Among these instruments the total coefficient was 0.65 and dual ICC coefficient indicated variance between 0.53 and 0.67.

It was indicated in our study that both scales had a good adaptability within physical, social and psychological functions, general health perception, pain and vitality/energy subfields using the Bland-Altman method. The Bland-Altman plot is a popular method for the assessment of comparative methods studies.³⁰ Nowadays, many statistical approaches have been suggested for the assessment of correlation between two similar methods. The method proposed above was put into practice.³¹ The Bland-Altman method is used as a prevailing instrument to assess the interchangeability of two methods of clinical measurement. It is used in the notification of the rate of agreement between two methods.³² In the literature, there have been studies in which different scales were compared using the Bland-Altman method for various patient groups.^{27,33-35} Others

have proved the adaptability of the similar subfields in the SF-36 and WHOQOL-100 scales with stroke patients using the Bland-Altman method,²⁹ but there has been no study in which these two scales have been compared in TB patients.

In terms of limitations, the study was an incisional type research. In long-term observational studies, the follow-up of variance of data facilitates the comprehension and interpretation of findings. For this reason, observational studies carried out using a similar method are required.

Another limitation, as well as a plus side of our study, is that our research was performed at an educational and research sanatorium run by the Ministry of Health where TB patients get the most comprehensive care and treatment. This may have carried a certain level of bias in the answers of the subjects.

Conclusion

There was good adaptability in physical, social and psychological functions, general health perception, pain and vitality/energy domains in the two scales which are widely used to measure life quality for both healthy groups and patients. It was found that WHOQOL-100 can be used as an alternative to the SF-36 scale which is widely used for TB patients. In the literature, there was no previous study comparing the two scales for TB patients and this emphasises the significance of the study.

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