Predictors for Quality of Life of Pulmonary Tuberculosis Patients in Yunnan Province of China

He Chaoyang *
Virasakdi Chongsuvivatwong **
Alan Geater ***

Introduction

Quality of life (QoL) of patients has social differentials (Shmueli, 2003; Vogl et al, 1999). For example, QoL of male is better than that of female for coronary artery disease using Seattle Angina Questionnaire Survey (Kimble et al, 2003). Among people suffer from acute coronary syndromes, QoL of the rich is better than that of the poor. (Rao et al, 2003).

Tuberculosis (TB) is a serious chronic infectious disease, identified by WHO as a global emergency. WHO estimated that worldwide eight million people have TB, of which two million die of TB every year (WHO, 1998). However, there have been very few reports on QoL of TB patients. There is a need to develop an instrument to measure QoL for this population. With better understanding and research, the QoL of patient can be improved and TB control program can be made more effective. In this study, we developed and validated TB quality of life scale (TBQoL) and explored its socio-demographic predictors.

---

* Department of Epidemiology, Faculty of Public Health, Kunming Medical College, China. E-mail: hechaoyang@hotmail.com; hechaoyang@yahoo.com

** Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Hat Yai District, Songkla Province 90110. Thailand. E-mail: cvirasak@ratree.psu.ac.th

*** Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Hat Yai District, Songkla Province 90110. Thailand. E-mail: galan@ratree.psu.ac.th

Methods

Scale development

We first reviewed 20 generic and specific-disease QoL scales. A TB epidemiologists and a TB clinician of Thailand helped by adding items related to TB health and social problems. Similarly, a QoL expert and a psychiatrist in Kunming of China added mental items and general issues. Independently, we asked 10 TB patients in Kunming TB hospital to add items from patients' perceptions of QoL. Based on WHOQOL-100 guide, we finally chose 54 items of 6 domains: physical, emotional/psychological, independent/functional, social/family, environmental and spiritual status (Power, Bullinger and Harper, 1997). These 54 items were evaluated by an expert team of 5 people in Thailand, reducing to 49 items. At this stage, the scale was translated from English into Thai and back translated to English by two independent groups that consisted of 6 Thai doctors with high fluency in English. Then compared with original English version by a native English expert and modified original version again. The scale was pre-tested with TB patients at the hospital of Prince of Songkla University, Thailand in May 2002. This version was reduced to 40 items and was evaluated by an expert team in China. It was translated and back translated again by teachers and post-graduate students of Faculty of Public Health, Kunming Medical College. Similarly, the scale was compared and modified by a native English expert. Then pre-tested on TB patients in Kunming TB hospital of China, which reduced to 36 items. Finally, the 36 items were validated among 484 TB patients (150 acid-fast bacilli positive) in Kunming and Xishuangbanna. Through factor analysis and Cronbach's alpha analysis, the final version of TBQoL has 24 items that were used in the multiple regression analysis on predictors. In this paper, we describe validation results of the final 24 items and predictors for final TBQoL using the same set of 150 AFB positive TB patients. Each item was divided into 5 points: not at all; a little bit; somewhat; quite a bit; very much (see Appendix). Positive items scored from 1 to 5; negative items were from 5 to 1, which would be revised before analysis. A high final score means a good QoL.

Subjects

In Kunming city, we collected data at two hospitals, namely Kunming TB Preventive and Treatment Hospital and TB Rehabilitation Center of Yunnan Province Center for Disease Control and Prevention (CDC). In Xishuangbanna prefecture, we recruited the patients from Xishuangbanna Prefecture Hospital, JinHong City Hospital, Menghai County Hospital and Clinic of Mengla County's CDC. These sites Directly Observed Treatment Short-Coursed (DOTS) were not covered during study period. Eligible participants were aged 18 year or above, with confirmed positive sputum for AFB smear from 1 October 2002 to 30 March 2003 in the above study hospitals. Exclusion criteria were: imprisonment; not willing to participate; with mental disorder; having other serious co-morbidity e.g. cancer, stroke, injury. Independent variables were demographic characteristics and clinic variables. Dependent variables were scores of domains and the total score of the quality of life scale.

Data collection

Research assistants consisted of 6 fifth-year medical students and 7 doctors from study hospitals' doctors. Intensive training was given before data collection. Face-to-face interviews were used to obtain patient's QoL data. The research assistant read each item of the scale and/or explained some items with neutral tone and asked the patient to assess quality of life by himself/herself. The period for the information of patients' feeling was one-week prior to the interview. At the hospital ward and clinic-waiting lobby, after establishing the patient's rapport and eligibility to participate, the research assistants provided informed consent and started interview after receiving oral consent of the patient.

Statistical analysis

The data collector immediately carried out coding after the interview and input the data into a computer using Epi data 2.1 with double entry and validation. Stata

7.0 software package was employed for statistical analysis. For the purpose of validation, principal component factor analysis with rotation was used to evaluate and score the 36 items using exploratory factor analysis. Items removed of which lead to improvement in factor analysis and Cronbach's alpha were excluded in further analysis. Correlation matrix was used to check whether each domain was relatively independent from the others.

Finally, in analysis of predictors, dependent variables were domains with items chosen from the above process and independent variables. Multiple regression analysis was used to come up with only significant socio-demographic predictors.

Results

Scale development

Demographic characteristics of the study sample are summarized in Table 1.

Table 1: Demography of 150 TB patients

Characteristic	Number	Percent (%)
Sex		
Male	104	69.3
Female	46	30.7
Age		
18-29	55	36.7
30-39	42	28.0
40-49	18	12.0
50-59	16	10.7
60+	19	12.6
Residence		
Urban	68	45.3
Rural	82	54.7

Table 1: (continued)

Characteristic	Number	Percent (%)
Education level		
Never attended school	20	13.3
Primary school	25	16.7
Secondary school	62	41.3
Vocational training	21	14.0
College/University	22	14.7
Occupation		
Farmer	51	34.0
Laborer	28	18.6
Businessman	5	3.3
Student	17	11.3
Civil servant	10	6.7
Retired	13	8.7
Unemployed	13	8.7
Other	13	8.7
Marital status		
Single	32	21.3
Married	113	75.4
Widow/widower	5	3.3
Income (RMB: family/month)		
<200	35	23.3
200-599.9	37	24.7
600-1199.9	38	25.3
1200-1999.9	23	15.3
2000+	17	11.4
HIV status		
Positive	7	4.7
Negative	63	42.0
Not tested	80	53.3

Table 2 shows that after loading with rotation 24 items could be grouped into 6 domains. Each item has low level of uniqueness. Six domains have low domain correlation coefficients as seen in Table 3.

Cronbach's alphas were 0.81, 0.88, 0.89, 0.79, 0.74 and 0.77 for Physical, Emotional, Independent, Social, Environmental and Spiritual domains of the new TBQoL. This indicates a high degree of reliability of outcomes used to construct each domain.

Table 2: Rotated Factor Loading on TBQoL after adjustment

Variable	1	2	3	4	5	6	Uniqueness
P1		0.65					0.42
P2		0.80					0.29
P3		0.60					0.36
P4		0.61					0.37
P5		0.74					0.29
P6		0.66					0.39
E1			-0.58				0.58
E2			-0.84				0.20
E3			-0.83				0.22
E4			-0.78				0.28
E5			-0.70				0.37
F1	0.75						0.36
F2	0.73						0.19
F3	0.89						0.16
F4	0.84						0.19
S1					0.77		0.32
S2					0.83		0.27
S3					0.72		0.34
N1				0.66			0.36
N2				0.79			0.24
N3				0.79			0.37
B1						0.83	0.25
B2						0.71	0.40
B3						0.67	0.30

Table 3: Domains Correlation matrix of the TBQoL

Domain	P	E	F	S	N	B
P	1.00					
E	0.35	1.00				
F	0.39	0.44	1.00			
S	0.09	0.23	0.29	1.00		
N	0.05	0.13	0.23	0.30	1.00	
B	0.17	0.37	0.38	0.34	0.33	1.00

* P: Physical status; E: Emotional status; F: functional/independent ability; S: Social/family status; N: Environmental relationship; B: Belief/spiritual status

Predictors of Quality of Life

Multiple regression analysis results are shown in Table 4. All independent variables were included simultaneously in each model. The total score associated with occupation and payment style but not sex, marital status, religion and ethnicity. It also has a linear trend of association with education and income, negative direction for the former and positive for the latter. The positive linear trend relationship with income is quite consistent in almost all domains.

Table 4: Multiple regressions to TBQoL with socio-economic variables (Coefficient/Standard Error)

Variable	P	E	F	S	N	B	T[&]
Female vs. male	-0.47/0.96	-1.74/0.88	-0.44/0.89	-0.40/0.50	-0.90/0.43	-0.43/0.46	-4.38/2.55
Age (ref.=18-29)							
30-	-1.50/1.26	-2.54*/1.15	-1.52/1.16	-0.04/0.66	-0.66/0.56	-1.11/0.60	-7.37*/3.32
40-	0.10/1.60	-0.74/1.46	-0.40/1.47	0.64/0.84	-0.38/0.72	-1.53*/0.76	-2.30/4.23
50-	0.30/1.73	0.78/1.58	0.21/1.59	-1.03/0.90	-1.01/0.78	-0.38/0.82	-1.13/4.56
60-80	-2.19/2.21	-1.23/2.02	-0.45/2.03	-0.04/1.15	-0.29/0.99	-0.53/1.05	-4.64/5.84
Marital (ref.=single)						(#)	
Married	0.47/1.69	1.48/1.54	0.45/1.55	1.71/0.88	-0.59/0.76	0.60/0.80	4.11/4.46
Widow (er)	-0.02/2.80	-1.12/2.55	-2.67/2.58	0.89/1.46	-2.18/1.26	-2.37/1.33	-7.47/7.39
Education (ref.=illiteracy)				(@@)	(@@)		(@)
Primary	-3.28*/1.56	-1.29/1.43	-0.43/1.44	-1.52/0.82	-0.71/0.70	0.28/0.74	-7.55/4.13
Secondary	-1.18/1.58	-0.63/1.44	-1.61/1.45	-1.98*/0.82	-2.10**/0.71	0.25/0.75	-7.23/4.16
College and Voc. training	-1.51/2.02	-2.01/1.84	-1.73/1.86	-3.32**/1.05	-3.01**/0.91	-0.77/0.96	-12.35*/5.33

Table 4: (continued)

Variable	P	E	F	S	N	B	T[&]
Female vs. male	-0.47/0.96	-1.74/0.88	-0.44/0.89	-0.40/0.50	-0.90/0.43	-0.43/0.46	-4.38/2.55
Occupation (ref.=farmer)		(#)		(##)			(#)
Labour	0.66/1.60	1.47/1.46	0.46/1.47	1.32/0.84	-0.68/0.72	0.52/0.76	3.75/4.23
Business	-2.11/2.42	4.19/2.20	1.22/2.22	2.17/1.26	0.45/1.09	2.00/1.15	7.90/6.38
Student	2.33/2.23	5.84**/2.03	6.02**/2.05	5.47**/1.16	0.60/1.00	0.97/1.06	21.23**/5.88
Civil servant	1.72/2.44	3.70/2.22	0.95/2.24	3.48**/1.27	-2.02/1.09	0.26/1.16	8.09/6.43
Retired	-0.122/2.34	2.89/2.14	-2.94/2.15	1.69/1.22	-0.87/1.05	0.78/1.12	1.43/6.18
Unemployed	0.68/1.68	-0.40/1.53	1.38/1.55	2.61**/0.88	0.50/0.76	-1.33/0.81	3.43/4.44
Other	4.06*/1.83	4.06*/1.67	2.46/1.68	2.87**/0.95	0.87/0.82	-0.75/0.87	14.11**/4.82
Religion (ref.=Buddhist)	(#)				(##)		
Christian	3.88/2.57	2.66/2.35	-2.78/2.37	1.45/1.34	0.68/1.16	2.07/1.23	7.96/6.79
Muslim	6.54*/3.17	2.29/2.89	1.92/2.91	1.21/1.66	2.75/1.43	1.04/1.51	15.75/8.37
No religion	2.38/1.24	1.26/1.13	0.78/1.14	1.08/0.65	-1.14*/0.56	-0.09/0.59	4.26/3.26
Others	-0.74/1.92	-0.49/1.75	0.25/1.76	0.36/1.00	-2.12*/0.86	0.48/0.91	-2.26/5.08
Ethnic (ref.=Han)					(#)	(##)	
Dai	3.07/2.24	0.94/2.04	-0.31/2.06	0.18/1.17	-3.42**/1.01	-1.89/1.07	-1.42/5.91
Yi	0.20/1.92	-1.35/1.76	0.09/1.77	1.30/1.01	0.64/0.86	1.95*/0.92	2.66/5.08
Miao	-2.96/4.86	2.42/4.44	2.19/4.47	3.13/2.54	0.85/2.19	0.59/2.32	6.22/12.84
Bai	-0.13/2.19	-3.30/2.00	-2.47/2.02	-2.50*/1.15	0.48/0.99	-3.97**/1.05	-11.88*/5.80
Zuang	-1.85/3.16	-2.44/2.89	-0.99/2.91	1.28/1.65	-1.09/1.42	0.77/1.51	-4.32/8.36
AiNi	1.43/2.15	-1.09/1.97	-0.45/1.98	1.20/1.13	2.07*/0.97	-1.23/1.03	1.93/5.69
Lafu	-2.80/2.92	0.53/2.66	-1.43/2.68	-3.17*/1.52	0.21/1.31	0.64/1.39	-6.03/7.70
Other	-3.29/2.11	-3.51/1.92	-3.94*/1.94	1.02/1.10	-0.77/0.95	-0.28/1.00	-10.77/5.56
Family income (ref.=<200 Yuan)	(@)	(@@)	(@@)	(@)		(@@)	(@@)
200-	0.88/1.24	1.05/1.14	1.81/1.15	-0.59/0.65	-0.95/0.56	-0.01/0.59	2.19/3.29
600-	0.22/1.30	2.32/1.19	3.16**/1.20	0.67/0.68	0.57/0.59	1.69**/0.62	8.63*/3.44
1,200-	1.00/1.49	3.65**/1.36	4.66**/1.37	1.62*/0.78	1.51*/0.67	2.41**/0.71	14.84**/3.92
>2,000	4.15*/1.67	3.29*/1.53	6.58**/1.54	1.20/0.88	-0.01/0.75	1.00/0.80	16.21**/4.42
Payment style (ref.=self)			(#)		(#)	(#)	(#)
Private ins.	3.12*/1.58	0.82/1.44	-0.61/1.45	-0.61/0.82	-0.57/0.71	-0.16/0.75	1.99/4.16
Civil servant ins.	0.14/2.25	-1.78/2.06	-0.68/2.07	-1.90/1.18	1.17/1.01	-1.41/1.07	-4.46/5.95
Social security	0.94/1.41	0.56/1.28	2.51/1.29	0.66/0.73	1.73**/0.63	0.45/0.67	6.86/3.71
Other	-2.27/1.95	-4.66**/1.81	-3.89*/1.80	-1.36/1.02	-1.54/0.88	-2.52**/0.93	-16.24**/5.16
Rural vs. urban	1.68/1.12	0.30/1.02	0.85/1.03	0.49/0.58	-0.53/0.50	0.02/0.53	2.79/2.95
Cons.	18.91**/2.67	17.37**/2.43	9.99**/2.45	10.13**/1.39	16.75**/1.20	12.17**/1.27	85.03**/7.04

*P<0.05; ** P <0.01 for Wald's test of different mean against the referent categories
(#) P<0.05; (##) P< 0.01 for test of different means among all categories
(@) P<0.05; (@@) P< 0.01 for test for linear trend.
&T: total QoL score

Discussion

After a series of pooling and selection of items potentially related to TBQoL, we could come up with a scale of 24 items in 6 domains. Within each domain, the consistency level is high. Among different domains, the correlation is low. Thus, the scale has good validation test results. The scale also shows differential among different categories of socio-economic groups indicating that it is sensitive enough to detect difference among groups.

We removed 12 items as a result of factor analysis to make a good construct validity of the TBQoL. Each correlation coefficient of different domains is lower than 0.45 suggesting a good divergent validity for the scale. Our final instrument has similar construct to its parents plus TB relevant items. Cronbach's alpha of each domain is greater than 0.7 insisting a good internal consistency or high reliability for the scale. Our TBQoL also fulfills the criteria that a QoL should be short, clear and simple (Denise et al, 2002).

Poor family income is one of the most obvious risk factors in many other studies for TB patients (Aghanwa and Erhabor, 1998; Floyd, 2003; Jack, 2001). Our study further elaborated that poor income is a strong predictor of low QoL with significant linear trend to all domains except environmental domain. In other words, QoL of TB patient is improving in all domains except environmental domains with increasing family income. This positive association may be explained by better physical, emotional and social supports available to the relatively rich. Environmental status of the TBQoL involves in items of health information and service such as "I have confidence in my doctors", "My doctor is available to answer my questions" and "I am satisfied with the local health service". This domain was not associated with family income. It reflects that the rich and the poor are not much discriminated against by health service.

Students have distinctly higher scores in emotional and social domains, but not in other domains. Perhaps these could be explained by the emotional and social livelihood of the students. For the same reason, emotional domain is worst among the unemployed, and social domain worst among the farmer.

In general, one would expect that physical domain would deteriorate with age (Orley, 1996; The WHOQOL Group, 1995). This is not supported by our data. HIV infected predisposing factor for TB, is more likely to be present in non-elderly. It may suppress QoL of this group, making them not significantly different from the elderly. Other age-related factors may act on other domains as well. However, as many TB patients were not tested for HIV in our study, this issue needs further investigation.
Similar to most other reports, male TB patients are more common than female (Herrman et al, 1996). There have been a few conjectures that sex differential is partly due to social gender issue. Male might have better access to health care than female due to social causes (Saxena and Orley, 1997). However, we could see that among the patients who get access to health care in our study area and sex did not have difference in QoL in all domains.

Although widows have consistently low scores in most domains, the sample size in the group is small. The study does not have enough power to detect their difference from the others.

From a previous study (Amir and Taya, 1998), urban patients have better QoL than their rural counterpart in the univariate analysis. This may be confounded by the fact that income of the urban is known to be high among the urban group. The differences are non-significant in our multiple regressions analysis. QoL of rural people is thus worse mainly due to poverty not due to their residence.

Health insurance in China does not have a universal coverage. Self-payment and other source of payment are not uncommon. Patients under standard insurance including private insurance, civil servant insurance and social security insurance do not have significant effect on QoL in most domains. Those who have ‘other’ payments are

worse in independent, environmental and spiritual domains. The group included patients who were not able to pay by themselves. They are likely to be in debt. This may be an explanation for the poorer QoL in this group.

The negative relationship level of education between social and environmental domains is in contrast to the non-significant findings in other domains. Higher education may increase stigmatization effect of TB compared to the low education group thus resulting in the negative effect of education (Hovell et al, 2003). Moreover, high education patients may also have higher expectation from TB health care thus leading to their low score in the environmental domain.

To our knowledge, this study is the first to address QoL differential among social groups. Our study is however limited to AFB positive patients who were mainly admitted to the hospital. Their QoL might be affected by hospitalization. QoL differential may be different in most other developing countries where almost all TB patients are treated as a home base. Information on HIV status, a strong predictor for QoL (Posner et al, 2000), was limited to a few patients due to limitation of the health care systems. The study has an implication for improvement of support especially for the poor. However, we proposed that the scale should be further tested in other countries and further developed in order to use for assessment of QoL in various settings.

Acknowledgements

This study is a part of the first author's thesis to fulfill the requirement for a Ph.D. in Epidemiology at Prince of Songkla University. Epidemiology Unit, Prince of Songkla University is partially supported by Thailand Research Fund through Senior Research Scholar Grant to Professor Virasakdi Chongsuvivatwong. The first author is partially supported by Thailand Tropical Disease Program (T2) for the scholarship of his study. The Fida Organization of Finland, which is a NGO, supports our fieldwork in China. We therefore thank their support of our project.

References

Aghanwa, H.S. and Erhabor, G.E. 1998. Demographic/socioeconomic factors in mental disorders associated with tuberculosis in southwest Nigeria. *Journal of Psychosomatic Research,* 45: 353-360.

Amir, M. and Taya, M. 1998. Quality of life among Israeli Arabs and Israeli Jews. *European Psychiatry,* 13: 185s.

Denise, R., Levin, S., Tom, S., Paul, J. and Azen, S. 2002. Validity of the SF-12 quality of life instrument in patients with retinal diseases. *Ophthalmology*, 109: 1793-1798.

Floyd, K. 2003. Costs and effectiveness—the impact of economic studies on TB control. *Tuberculosis*, 83: 187-200.

Herrman, H., Murphy, B., Freidin, S. and Allen, N. 1996. Development of the Who Quality of Life Assessment Instrument (WHOQOL) and its Application in Assessing the Recovery from Depression. *European Neuropsychopharmacology*, 6: 166.

Hovell, M., Blumberg, E., Trejo, L.G., Vera, A., Kelley, N., Sipan, C., Hofstetter, C.R., Marshall, S., Berg, J., Friedman, L., et al. 2003. Predictors of adherence to treatment for latent tuberculosis infection in high-risk Latino adolescents: a behavioral epidemiological analysis. *Social Science & Medicine*, 56: 1789-1796.

Jack, W. 2001. The public economics of tuberculosis control. *Health Policy*, 57: 79-96.

Kimble, L.P., McGuire, D.B., Dunbar, S.B., Fazio, S., De, A., Weintraub, W.S. and Strickland, O.S. 2003. Gender differences in pain characteristics of chronic stable angina and perceived physical limitation in patients with coronary artery disease. *Pain*, 101: 45-53.

Orley, J. 1996. Quality of life: the WHOQOL. *European Psychiatry*, 11:.228.

Posner, G.S., Lecusay, R., Miguez-Burbano, M.J., Quesada, J., Rodriguez, A., Ruiz, P., O'Mellan, S., Campa, A., Rincon, H., Wilkie, F., et al. 2000.Quality of Life Measures in the Miami HIV-1 Infected Drug Abusers Cohort: Relationship to Gender and Disease Status. *Journal of Substance Abuse*, 11: 395-404.

Power, M., Bullinger, M. and Harper, A. 1997. The World Health Organization WHOQOL-100: Tests of the Universality of Quality of Life in 15 Different Cultural Groups Worldwide. *Health Psychology*, 18: 495-505.

Rao, S.V., Kaul, P., Newby, L.K., Lincoff, A.M., Hochman, J., Harrington, R.A., Mark, D.B. and Peterson, E.D. 2003. Poverty, process of care, and outcome in acute coronary syndromes. *Journal of the American College of Cardiology*, 41:1948-1954

Saxena, S. and Orley, J. 1997. Quality of life assessment: the World Health Organization perspective. *European Psychiatry*, 12: 263s-266s.

Shmueli, A. 2003. Socio-economic and demographic variation in health and in its measures: the issue of reporting heterogeneity. *Social Science & Medicine*, 57: 125-134.

Vogl, D., Rosenfeld, B., Breitbart, W., Thaler, H., Passik, S., McDonald, M. and Portenoy, R.K. 1999. Symptom prevalence, characteristics, and distress in AIDS outpatients. *Journal of Pain and Symptom Management*,18: 253-262.

WHOQOL Group. 1995. The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. *Social science & Medicine*, 41: 1403-1409.

World Health Organization. 1998. Press Release WHO/71,14 October Geneva.

Appendix

TUBERCULOSIS QUALITY OF LIFE SCALE

(TBQoL)

Instructions:

This questionnaire asks how you feel about your health status and other areas of your life. Please answer all the questions. By circling only one number that indicates how true each statement has been for you during ***the past 7 days***. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. **Thank you for your cooperation and contribution**.

PHYSICAL (P)	**Not at all** 1	**A little bit** 2	**Some-what** 3	**Quite a bit** 4	**Very much** 5	**Coding number**
1. I have been short of breath						P1[ ]
2. I have been coughing						P2[ ]
3. I sweat at night.						P3[ ]
4. I have felt feverish during the afternoon						P4[ ]
5. I cough up sputum						P5[ ]
6. I have lack of energy						P6[ ]
PSYCHOLOGICAL/EMOTIONAL (E)						
7. I think other people despise me because I have got the disease						E1[ ]
8. I feel sad						E2[ ]
9. I feel nervous						E3[ ]
10. I worry that my condition will get worse						E4[ ]
11. I worry about dying						E5[ ]
LEVEL OF INDEPENDENCE/FUNCTIONAL (F)						
12. I am able to wear clothes and take a bath by myself						F1[ ]
13. I enjoy the things I usually do for fun						F2[ ]
14. I am able to work (include work at home)						F3[ ]
15. My work (include work at home) is fulfilling						F4[ ]
SOCIAL/FAMILY WELL-BEING (S)						
16. My family has accepted my illness						S1[ ]
17. I get emotional support from my family						S2[ ]

SOCIAL/FAMILY WELL-BEING (S)	**Not at all** 1	**A little bit** 2	**Some-what** 3	**Quite a bit** 4	**Very much** 5	**Coding number**
18. I get support from my friends and neighbors						S3[ ]

ENVIRONMENT (N)

19. I have confidence in my doctors						EN1[ ]
20. My doctor is available to answer my questions						EN2[ ]
21. I am satisfied with the local health service						EN3[ ]

BELIEF AND SPIRITUALITY (B)

22. My personal spirituality gives me strength to face my illness.						B1[ ]
23. My life is meaningful.						B2[ ]
24. I am proud of how I have confidence to cope with my illness						B3[ ]