

Health-State Utilities in Liver Cirrhosis: A Cross-Sectional Study

Peyman Adibi¹, Leila Akbari², Leila Sadat Kahangi², Fatemeh Abdi²

¹Associate Professor, Department of Gastroenterology, Integrative Functional Gastroenterology Research Centre, Isfahan University of Medical Sciences, Isfahan, Iran.

²School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.

Correspondence to:

Fatemeh Abdi

School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

Email: f_abdi@nm.mui.ac.ir

Date of Submission: June 22, 2011

Date of Acceptance: Aug 23, 2011

How to cite this Article: Adibi P, Akbari L, Kahangi L, Abdi F. Health-State Utilities in Liver Cirrhosis: A Cross-sectional Study. *Int J Prev Med* 2012; Special issue, S94-101.

ABSTRACT

Objectives: Liver cirrhosis is a serious disease which can change many aspects of life of the patients, and their family and also effects society. Health-related quality of life (HRQL) in patients with cirrhosis can be evaluated using utility assessment techniques. We aimed to study the utility of cirrhosis from the point of view of the patients, their family, and their caretakers to find appropriate interventions, and training and counselling programmes to support patients.

Methods: In this cross-sectional study with a purposive sampling method, 66 subjects, consisting of 30 patients with decompensated cirrhosis (all of whom were on the liver transplant waiting list), 21 family caregivers, and 15 caretakers, were included. We administered data collection in face to face interviews and through paper-based questionnaires. We also elicited utilities using formal approaches; time trade-off (TTO), standard gamble (SG), rating scale (RS), and the willingness to pay (WTP).

Results: There were statistically significant differences in utilities assigned by three groups in all preference-based measures ($P < 0.05$). The total utility score of patients was lower in comparison to their family members and caretakers. The Spearman's correlation coefficient showed that the three methods of TTO, RS, and SG were convergent in the caretaker group and divergent in the patient group. The only significant correlations between utilities were between TTO and WTP in the patient group and between TTO and RS in family caregiver group ($P < 0.05$).

Conclusions: utility assessments indicate that Health-related quality of life (HRQL) is compromised in patients with cirrhosis. These data can be the basis for cost-effectiveness analyses in studies of patients with chronic liver disease.

Keywords: Cirrhosis, liver transplantation, health-state, utility assessment

INTRODUCTION

Cirrhosis is a serious and irreversible disease^[1] which affects most of the body organs and systems.^[2] Cirrhosis is one the most important causes of death in the world^[1] and therefore, is considered as one of the major health issues.^[3] In patients suffering from advanced cirrhosis, liver transplant is life saving^[4] and the only definite cure of this illness.^[5] Today, liver transplant is an internationally prevalent and life saving surgery.^[6] In 2006, 6650 liver transplants were performed in the United States which is in fact 4 times the number performed in 1998.^[7] In Iran, every year around 1000 patients need a liver transplant; however a large number of them die while they are still on the transplant waiting list.^[8]

In modern medicine, the method of studying change in patients is based on clinical examination and focused laboratory studies. Although, these methods give important information about chronic and progressive diseases, not all aspects of the patients' life can be studied this way.^[9] During recent years, assessment of utility and health-related quality of life (HR-QoL) of patients with chronic diseases has become a goal^[10,11] and their application, especially in the field of gastroenterology, has attracted the attention of many researchers.^[12]

Researches show that health-related quality of life (HR-QoL) is damaged in patients with cirrhosis.^[13] The quality of life of these patients is affected by the complications and limitations which causes disorder in activities, social functioning and the psychological state of the patient.^[14,15] The accurate assessment of the quality of life and utility for the calculation of health-adjusted life expectancy is necessary for the medical intervention in cirrhosis.^[16]

A major method of studying the quality of life of patients awaiting liver transplant, which is considered as an important factor in predicting health statuses, is the study of the measure of utility of patients.^[17] Utility is an important and foundation tool of the evaluation of health-related quality of life (HR-QoL) which studies the evaluation and preference of individuals with a specific state of health.^[18] Utility is studied through the techniques of standard gamble (SG), time trade-off (TTO), willingness to pay (WTP), or rating scale (RS).^[19]

In the SG technique, the patient has two choices; life in the current state of health or the gamble of life by choosing a new treatment method, which has an unknown result, which could be death. TTO is when by the study of the individuals' view about the least amount of time of life expectancy resulting from the treatment, with assumption of a short life. RS is a graded relation which evaluates the individuals' view of their current health status, and finally WTP studies the willingness to spend money on treatment procedures.^[20]

Utility score varies between 0 and 1; which is

graded according to the individuals' preferences. 0 is attributed to the 'least favourable condition' (death) and 1 to the 'most favourable condition' (perfect health).^[21] The evaluation of the measure of utility from the view point of the patients allows them to be placed in a valued assessment and attracts their attention to the disease process. In the circumstance that this factor is combined with other affective factors, such as survival rate and cost-effectiveness, it will be one the important decision making factors for planners and policymakers of health and treatment.^[17,21]

Liver cirrhosis is one of the illnesses that can change many aspects of life of not only the individual but also their family and effects society. Study shows that when one member of the family is ill, all members are affected by that illness.^[22]

Considering that no research has been undertaken on utility of liver cirrhosis with the mentioned techniques which studies utility in detail.^[23,24] No doubt, gaining information on this topic is important to look at the topic in detail and from all aspects and to look at cirrhosis from the view point of the patients and their family. Therefore, this research was undertaken with the goal of assessing utility of cirrhosis from the point of view of the patients, their family, and their caretakers to help planners and health service providers for appropriate interventions, and training and counselling programmes to support patients. Moreover, the identification of affective factors on this illness can encourage caretakers to effectively support these patients.

METHODS

This cross-sectional study with a purposive sampling method was undertaken in the Gastroenterology ward of Alzahra hospital (Isfahan, Iran) during 6 months in 2010. The study population was 66 individuals constructed of 30 patients with decompensated cirrhosis (all patients on the liver transplant waiting list), 21 of the patients' family members, and 15 caretakers. After informing the partakers on the research, a written consent was obtained from them.

Inclusion criteria of the study were:

- 1- Definitive diagnosis of decompensated cirrhosis (Child C) based on clinical, biochemical, and ultrasonographic criteria, and liver histological data.
- 2- Patient is not alone, and at least one family member takes part in caring and treatment of patient.
- 3- The presence of caretakers which have at least 6 months work experience.

Exclusion criteria of the study consisted of hepatic encephalopathy, identified mental illnesses and unwillingness to partake in the research.

The required information was collected through face to face interview and completing of questionnaire. To avoid the effect of the presence of patients or their family member in the assessment, interview for the patient and their family member was performed without the presence of others.

The first part of the questionnaire consisted of demographic information (age, gender, marital status, and income) and the duration of illness. The second part consisted of the assessment of utility of cirrhosis using techniques of time trade-off, standard gamble, rating scale, and the willingness to pay. Validity and reliability of the mentioned tools had been assessed in different researches and had been proven. The interview time was 30 to 60 minutes. To make the topic of techniques of evaluation of utility clear, the questions were explained in a number of times different ways and answers were evaluated to gain a definite answer.

Utility assessment:

We determined the utility for decompensated cirrhosis using four standard assessment techniques: SG, TTO, RS and WTP. We converted each assessment to a utility that ranged from 0 to 1. In this scale, zero equals death and 1 equals good health. We administered four utility measures in face to face interviews, by a questionnaire. The interviewers used a standardized script for the utility assessments.

Standard gamble (SG):

In this method, the interviewers presented a hypothetical medical treatment (liver transplant) that had a chance of curing the cirrhosis but could also cause immediate death. The respondents were given a choice between remaining in their current health status for the rest of their lives, and undergoing a risky treatment. The two alternatives, indicated a "gamble" (risk of death associated with treatment) and a "certain state" (current health).

Time trade-off (TTO):

The TTO instrument is a self-administered, utility measurement that evaluates the individual's willingness to live a shorter but healthier life.^[18] In the TTO, subjects are asked to "trade" years of their lives for a perfect health in their fewer remaining years.^[21] In this method, subjects were told that they would live in their current health status for 20 years. Furthermore, subjects were asked to choose between a declined number of years of perfect health (liver transplant) and a further number of years living with a less desirable health status (current cirrhosis). A utility score is calculated by dividing the number of years of perfect health at the equivalence point by 20.

Rating scale (RS):

For the RS technique, subjects locate their perception of health status along a scale from 0 to 100.^[21] The RS method asked subjects to rate their current state of health on a 0 to 100 scale, that 0 indicates the least favourable condition (death) and 100 indicates the most favourable condition (perfect health). The RS value was the raw score divided by 100.

Willingness to pay (WTP):

WTP is a method of quantifying preferences, which is gaining popularity in health care. WTP provides a measure of the value an individual places on a special treatment preference.^[25] During the WTP task, we asked the participants to quantify their preference by stating how much

they would be willing to pay to obtain the treatment of liver transplant.

Statistical Analysis

Continuous variables were summarized as mean and standard deviation (SD). For multiple comparisons among groups one-way ANOVA for continuous variables was performed and P-values of 0.05 were considered to be statistically significant. Spearman's correlation coefficients were used to analyze the relationship between the measures of utilities per group.

RESULTS

In this research, from the 66 participants, 30 were decompensated cirrhotic patients, 21 were patients' family members, and 15 were caretakers. 52% of participants were men and 48% women which consisted of 58 married, 4 single, and 4 divorced or widowed. The mean age of participants in this research was 48.7 years and mean and standard deviation of the duration of having cirrhosis was 3.7 ± 1.4 years. The highest frequency of income level was 51%, related to a medium income level (Table 1).

Mean of overall utility and cirrhosis utility evaluation in patients, their families and caretakers is given in table 2. Mean scores of utility of the three groups in all preference-based meas-

ures had significant differences ($P < 0.05$). Different techniques of patient utility in this research from the highest to the lowest were SG (0.55), WTP (0.54), RS (0.25), and TTO (0.05), respectively.

In the family and caretakers group the highest to lowest scores were respectively WTP (0.89, 0.67), SG (0.37, 0.66), RS (0.22, 0.16), and TTO (0.10, 0.05). In conclusion the total utility score of patients (0.40 ± 0.08) was lower in comparison to their family members (0.50 ± 0.07) and caretakers (0.44 ± 0.06) (Table 2).

On the subject of the relationship between utility values, the Spearman's correlation coefficient showed that the three methods of TTO, RS, and SG were convergent in the caretaker group and divergent in the patient group. There was a direct, meaningful correlation between WTP and TTO in patients (0.360), however, there was a divergent correlation between the two methods in the caretaker group (-0.014). In the family members group the three methods of WTP, TTO, and SG had a positive correlation and there was only a divergent correlation between RS and the three methods. The only linear and meaningful correlation between utilities was observed between WTP and TTO in patients (0.360) and between TTO and RS in their family members (-0.705) ($P < 0.05$) (Table 3).

Table 1. Baseline characteristics of the participating population

Variables\ Group	Patient	Family Caregiver	Caretaker	Total
Age [Mean(SD)]	54.5(10.1)	48.6(13.0)	37.4(8.2)	48.7(12.5)
Gender (%)				
Male	17(57)	10(48)	7(47)	34(52)
Female	13(43)	11(52)	8(53)	32(48)
Marital status (%)				
Single	0(0.0)	0(0.0)	4(27)	4(6)
Married	27(90.0)	20(95.2)	11(73.3)	58(88)
Divorced/widowed	3(10.0)	1(5)	0(0.0)	4(6)
Income level (%)				
Low	10(33.3)	4(19.0)	1(6.7)	15(23)
Moderate	17(56.7)	16(76.2)	1(6.7)	34(51)
High	3(10.0)	1(4.8)	13(86)	17(26)
Time since disease (Year) [Mean(SD)]	3.7(1.4)	-	-	-

Table 2. Mean utility scores of cirrhosis disease

Utility measures	Subjects [Mean(SD)]			Total [Mean(SD)]	P value
	Patient	Family Caregiver	Caretaker		
Standard gamble (SG)	0.55(0.11)	0.37(0.19)	0.66(0.22)	0.52(0.20)	< 0.01
Rating scale (RS)	0.25(0.10)	0.22(0.10)	0.16(0.07)	0.22(0.10)	0.03
Time trade-off (TTO)	0.05(0.01)	0.10(0.04)	0.05(0.007)	0.07(0.03)	< 0.01
Willingness to pay (WTP)	0.54(0.27)	0.89(0.10)	0.67(0.18)	0.68(0.26)	< 0.01
Utility	0.40(0.08)	0.50(0.07)	0.44(0.06)	0.44(0.08)	< 0.01

DISCUSSION

Considering the growing increase in epidemiology of and lack of a definite cure for chronic diseases, and also because of the significant increase of care costs and people’s concern about the results of treatments, this research studied and compared the utility of cirrhosis using the WTP, TTO, RS, and SG tools.

The results of the study showed that patients with cirrhosis had a lower utility. This shows that the quality of life of these patients is low. The findings of this study are in accordance with

other researches. Younossi et al., in the evaluation of utility using the Health Utility Index in 120 patients with chronic liver disease, of whom 51% had cirrhosis, stated that patients with Child B and C cirrhosis have a lower utility (0.67 and 0.56, respectively).^[26] In this respect, Bryce et al. also found that utility and health related quality of life of cirrhotic patients on the liver transplant waiting list is at risk.^[27] The comparison of results shows that the severity of illness is one of the factors affective on quality of life of cirrhotic patients.^[5]

Table 3. Spearman's correlation coefficients between utility values in three groups

Patient group				
Parameter	SG	RS	TTO	WTP
SG	-----	-0.077	-0.042	-0.264
RS	-0.077	-----	-0.103	0.115
TTO	-0.042	-0.103	-----	0.360*
WTP	-0.264	0.115	0.360*	-----
Family caregiver group				
Parameter	SG	RS	TTO	WTP
SG	-----	-0.244	0.059	0.269
RS	-0.244	-----	-0.705*	-0.182
TTO	0.059	-0.705*	-----	0.194
WTP	0.269	-0.182	0.194	-----
Caretaker group				
Parameter	SG	RS	TTO	WTP
SG	-----	0.239	0.048	-0.209
RS	0.239	-----	0.189	0.098
TTO	0.048	0.189	-----	-0.014
WTP	-0.209	0.098	-0.014	-----

SG: Standard gamble, TTO: Time Trade-off, RS: Rating scale, WTP: Willingness to pay

*P < 0.05

The results of the current study suggested that the cirrhosis status has had the most negative effect on patients, and that patients had a lower utility rate than their family members and caretakers. This was confirmed in a study by Ong *et al.*, which showed that patients with advanced chronic diseases have a lower quality of life, in relation to their health, in comparison to healthy individuals in society.^[28] It is probably due to this fact that patients had a more knowledge of their disease and had lived with their disease, however, their caretakers were not directly involved in the disease, and were only viewers of the patient and the disease. The utility rate of patients was closer to the utility rate of the caretakers, which can be attributed to the caretakers' higher involvement in the treatment process.

The highest prevalence of cirrhosis is between 20-50 years of age and in men.^[5] In this study, 52% of patients were men and were mostly in this age group.

One method of evaluating utility is standard gamble which is used in the calculation of quality-adjusted life year (QALY).^[29] In the current study, the mean score of cirrhosis utility with SG was 0.52. Chong *et al.* reported decompensated cirrhosis utility to be 0.60, which is consistent with this study.^[30] The utility speculation by patients in the current study, the highest score was of SG. An important point is that the inclination for a liver transplant as a treatment choice, is representative of their degree of risk taking.^[27] Peltekian found that analysis of standard gamble scores may be unreliable, because patients reported problems in answering these questions.^[31]

Moreover, in the current study the participants were willing to exchange their years of life with fewer remaining years but be treated. Considering that TTO and SG methods depend significantly on motivation, judgment, and cognition of individuals, and the difference between the methods of TTO and SG is attributed to the view of individuals in danger for new hypothetical treatment,^[20] therefore to generalize the results of this study a larger population is recommended.

A common belief exists that RS utility scores are lower than that of TTO, and SG.^[32] The results of the current study did not support the belief that RS scores are lower than TTO scores. However, other studies did not support this case and the findings of the study of Doctor *et al.* was in accordance with this study.^[32]

Attention to the rate of multiple utility techniques in this study shows that the highest score of patients was related to WTP. This finding suggests that a higher WTP score is representative of a lower quality of life. The results of the study of Lundberg *et al.* showed that the willingness to pay costs in patients of psoriasis is related to the life quality index, activity, and severity of illness. They stated that patients were willing to spend 9-14% of their monthly income on treatment of the illness.^[33]

On the relationship between utility values, the results of the current study showed that between WTP and TTO in patients, a direct correlation exists, and in the caretakers group a weak inverse correlation. Study shows that a probable cause of this is complex nature of the questions which causes great measurement errors in evaluation methods of utility.^[33]

In recent years, evidence-based medicine along with other biological or life-death markers have emphasized the importance of using markers of patients' preference.^[34] This study evaluated the utility of cirrhosis using four preference-based measures for the first time. The results of this study can be a guide to other researches in this area, and also be valuable to health policy-makers in cost-benefit analysis in liver transplant in cirrhotic patients. In order to complete research related to cirrhosis utility, a more comprehensive research by the mentioned techniques is suggested so that its results can be generalized more accurately. Moreover, considering the lack of foundation research and studies for the understanding utility status in chronic diseases, emphasis on future research in this area seems necessary.

This study had some limitations of which a small sample size of cirrhotic patients in a gastroenterology centre, individual differences, and mental state of the individual at the time of the

interview can be mentioned. It is suggested that similar studies be undertaken in the shape of a multi-centre or country clinical trial on a larger number of patients.

REFERENCES

1. Khan H, Zarif M. Risk factors, complications and prognosis of cirrhosis in a tertiary care hospital of Peshawar. *Hepatitis Monthly* 2006; 6(1): 7-10.
2. Kashifard M, Saravi M, Taheri H, Bahreini R. Echocardiographic findings in cirrhotic patients with and without ascites compared to normal. *Journal of Babol University of Medical Sciences* 2010; 12(4): 48-53.
3. Minakari M, Faiiaz L, Rowshandel M, Shavakhi A. Comparison of the effect of midodrine versus octreotide on hemodynamic status in cirrhotic patients with ascites. *J Res Med Sci* 2011; 16(1): 87-93.
4. Jay CL, Butt Z, Ladner DP, Skaro AI, Abecassis MM. A review of quality of life instruments used in liver transplantation. *J Hepatol* 2009; 51(5): 949-59.
5. Zandi M, Adib-Hajbagheri M, Memarian R, Nejhad AK, Alavian SM. Effects of a self-care program on quality of life of cirrhotic patients referring to Tehran Hepatitis Center. *Health Qual Life Outcomes* 2005; 3: 35.
6. Tayebi Z, Abedi HA. The lived experiences of liver transplant patients. *IJNMR* 2008; 13(2): 73-80.
7. Castaldo ET, Feurer ID, Russell RT, Pinson CW. Correlation of health-related quality of life after liver transplant with the Model for End-Stage Liver Disease score. *Arch Surg* 2009; 144(2): 167-72.
8. Nikeghbalian S, Pournasr B, Aghdami N, Rasekhi A, Geramizadeh B, Hosseini Asl SM, et al. Autologous transplantation of bone marrow-derived mononuclear and CD133(+) cells in patients with decompensated cirrhosis. *Arch Iran Med* 2011; 14(1): 12-7.
9. Pashaii Sabet F, Nikbakht Nasrabadi A, Karami Kabir N. Life with hemodialysis unit: A phenomenological study. *Iranian Journal of Critical Care Nursing* 2011; 4(2): 59-66.
10. Wan LS, Lee TF, Chien CY, Chao PJ, Tsai WL, Fang FM. Health-related quality of life in 640 head and neck cancer survivors after radiotherapy using EORTC QLQ-C30 and QLQ-H&N35 questionnaires. *BMC Cancer* 2011; 11: 128.
11. Efficace F, Bottomley A, Osoba D, Gotay C, Flechtner H, D'haese S, et al. Beyond the development of health-related quality-of-life (HRQOL) measures: a checklist for evaluating HRQOL outcomes in cancer clinical trials--does HRQOL evaluation in prostate cancer research inform clinical decision making? *J Clin Oncol* 2003; 21(18): 3502-11.
12. Stahl E, Jansson SA, Jonsson AC, Svensson K, Lundback B, Andersson F. Health-related quality of life, utility, and productivity outcomes instruments: ease of completion by subjects with COPD. *Health Qual Life Outcomes* 2003; 1: 18.
13. Kalaitzakis E, Josefsson A, Bjornsson E. Type and etiology of liver cirrhosis are not related to the presence of hepatic encephalopathy or health-related quality of life: a cross-sectional study. *BMC Gastroenterol* 2008; 8: 46.
14. Marchesini G, Bianchi G, Amodio P, Salerno F, Merli M, Panella C, et al. Factors associated with poor health-related quality of life of patients with cirrhosis. *Gastroenterology* 2001; 120(1): 170-8.
15. Burra P, De BM, Canova D, Feltrin A, Ponton A, Ermani M, et al. Longitudinal prospective study on quality of life and psychological distress before and one year after liver transplantation. *Acta Gastroenterol Belg* 2005; 68(1): 19-25.
16. Wells CD, Murrill WB, Arguedas MR. Comparison of health-related quality of life preferences between physicians and cirrhotic patients: implications for cost-utility analyses in chronic liver disease. *Dig Dis Sci* 2004; 49(3): 453-8.
17. Sherman KE, Sherman SN, Chenier T, Tsevat J. Health values of patients with chronic hepatitis C infection. *Arch Intern Med* 2004; 164(21): 2377-82.
18. Hsu PC, Krajden M, Yoshida EM, Anderson FH, Tomlinson GA, Krahn MD. Does cirrhosis affect quality of life in hepatitis C virus-infected patients? *Liver Int* 2009; 29(3): 449-58.
19. Ferreira PL, Ferreira LN, Pereira LN. How consistent are health utility values? *Qual Life Res* 2008; 17(7): 1031-42.
20. Lin MR, Hwang HF, Chung KP, Huang C, Chen CY. Rating scale, standard gamble, and time trade-off for people with traumatic spinal cord injuries. *Phys Ther* 2006; 86(3): 337-44.
21. Roberts RA, Abrams H, Sembach MK, Lister JJ, Gans RE, Chisolm TH. Utility measures of health-related quality of life in patients treated for benign paroxysmal positional vertigo. *Ear Hear* 2009; 30(3): 369-76.
22. Pashae F, Taleghani F, Tavakol Kh, Rezae A. Family experiences from caregiving of patient with coronary artery bypass graft surgery: a qualitative study. *IJNR* 2010; 5(16): 61-71.
23. Dan AA, Kallman JB, Srivastava R, Younoszai Z, Kim A, Younoszai ZM. Impact of chronic liver disease and cirrhosis on health utilities using SF-6D

- and the health utility index. *Liver Transpl* 2008; 14(3): 321-6.
24. McLernon DJ, Dillon J, Donnan PT. Health-state utilities in liver disease: a systematic review. *Med Decis Making* 2008; 28(4): 582-92.
 25. Marra CA, Frighetto L, Goodfellow AF, Wai AO, Chase ML, Nicol RE, et al. Willingness to pay to assess patient preferences for therapy in a Canadian setting. *BMC Health Serv Res* 2005; 5: 43.
 26. Younossi ZM, Boparai N, McCormick M, Price LL, Guyatt G. Assessment of utilities and health-related quality of life in patients with chronic liver disease. *Am J Gastroenterol* 2001; 96(2): 579-83.
 27. Bryce CL, Angus DC, Switala J, Roberts MS, Tsevat J. Health status versus utilities of patients with end-stage liver disease. *Qual Life Res* 2004; 13(4): 773-82.
 28. Ong SC, Mak B, Aung MO, Li SC, Lim SG. Health-related quality of life in chronic hepatitis B patients. *Hepatology* 2008; 47(4): 1108-17.
 29. Vasiliadis HM, Collet JP, Penrod JR, Ferraro P, Poirier C. A cost-effectiveness and cost-utility study of lung transplantation. *J Heart Lung Transplant* 2005; 24(9): 1275-83.
 30. Chong CA, Gulamhussein A, Heathcote EJ, Lilly L, Sherman M, Naglie G, et al. Health-state utilities and quality of life in hepatitis C patients. *Am J Gastroenterol* 2003; 98(3): 630-8.
 31. Peltekian KM. Finally real utility scores for hepatitis C patients! *Can J Gastroenterol* 2004; 18(6): 411-2.
 32. Doctor JN, Bleichrodt H, Lin HJ. Health utility bias: a systematic review and meta-analytic evaluation. *Med Decis Making* 2010; 30(1): 58-67.
 33. Lundberg L, Johannesson M, Silverdahl M, Hermansson C, Lindberg M. Quality of life, health-state utilities and willingness to pay in patients with psoriasis and atopic eczema. *Br J Dermatol* 1999; 141(6): 1067-75.
 34. Morimoto T, Fukui T. Utilities measured by rating scale, time trade-off, and standard gamble: review and reference for health care professionals. *J Epidemiol* 2002; 12(2): 160-78.

Source of Support: Nil **Conflict of Interest:** None declared