Comparison of Utility Scores and Quality of Life Scores in Thai Patients between Twice and Thrice-Weekly Hemodialysis

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ABSTRACT

Objective: To compare the utility scores and quality of life scores between patients who have twice and thrice-weekly hemodialysis.

Methods: This was a cross-sectional analytical study in 5 hemodialysis sites of the Nephrology Unit at Siriraj Hospital (the largest university hospital in Thailand), face-to-face interview using EuroQol questionnaire (EQ-5D), VAS, and KDQOL-36 (consists of 3 kidney disease subscales and SF-12) which was conducted between April 2011 and June 2011. One hundred and fifty three hemodialysis patients were recruited from the chronic hemodialysis clinic unit. This study compared the difference of hemodialysis times weekly to utility scores and quality of life scores of patients by using Independent Student's t-test.

Results: SF-6D (derived from SF12), EQ-5D (UK and Thai preference weight), and VAS between the patients who received twice and thrice-weekly hemodialysis were not significantly different ($p>0.05$). This is also true for symptom/ problem list, effects of kidney disease, and burden of kidney disease scores. For SF-12, all physical and mental domains were not significantly different and similarly all utility and kidney disease specific scores were not significantly associated with hemodialysis times in weekly intervals (all, $p>0.05$).

Conclusion: These findings implied that thrice-weekly hemodialysis could not reflect the better quality of life more than twice-weekly hemodialysis. There was no significant difference in quality of life from the symptom/ problem list, effects of kidney disease, and burden of kidney disease between twice and thrice-weekly hemodialysis as well as the utility scores from SF-6D, EQ-5D and VAS. However, a further large cohort study of utility scores or cost effectiveness analysis between the difference of dialysis frequency at weekly intervals should be conducted.

Keywords: Utility, quality of life, twice-weekly, thrice-weekly, hemodialysis

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INTRODUCTION

While most US, European and Japanese patients receive standard thrice-weekly hemodialysis (HD), most Thai patients receive only twice-weekly hemodialysis due to economic constraints, reimbursement policy and patients who feel that hemodialysis interferes too much with their lives. However, the question of the benefits, such as quality of life and relationship to dialysis frequency per week has remained controversial since the beginning of long-term dialysis treatment. Three HD sessions a week are most common and the randomized clinical trials of longer dialysis sessions thrice-weekly hemodialysis warrant the conclusion that the longer treatment time and higher Kt/V were associated with lower mortality (Kt/V is a formula for measuring dialysis adequacy, where K = dialyzer clearance (ml/min), the rate at which blood passes through the dialyzer; t = time (min), V = volume of water in a patient's body (L)). It is based on tests of blood urea, by measuring the levels before and after treatment, to show how much has been removed).[1] Observational studies suggested a benefit from increasing the delivered hemodialysis quantity well above the minimal targets recommended by the international guidelines.[1-4] However, the randomized controlled trials, Hemodialysis (HEMO) study and ADEMEX concluded that there were no benefits to patients' outcomes from higher dialysis frequencies than those recommended by the present guidelines.[5,6] Earlier studies showed that twice-weekly HD were used for elderly patients, women, patients with low body mass index, and patients with renal residual function at the

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beginning of renal replacement therapy (RRT),[7] but they are not recommended by the current international guidelines or in patients with urea clearance <2 ml/min.[8] The different times for weekly hemodialysis, such as twice-weekly, thrice-weekly, or nocturnal hemodialysis depend on the financial support and reimbursement policy, but the study of comparison of the quality of life of the difference of times of weekly hemodialysis are rarely published in studies, except for the comparison dealing with the nocturnal and conventional hemodialysis.[9] Nowadays, the quality of life is more important because long term hemodialysis often results in a loss of financial income, loss of freedom, dependence on health-care personnel and caregivers, affects marital, family, and social life, thus quality of life analysis should be conducted for these patient groups.[10] The frequency of hemodialysis per week can affect their quality of life in the different points. However, the quality of life from the difference of dialysis frequency per week remains unknown in a developing country such as Thailand. The KDQOL-36 is the preferred measurement tool for large-scale assessments in dialysis facilities because of its ease of administration with relatively minimal burden on patients and staffs.[11] KDQOL-36 consists of the SF-12 measure of physical (PCS) and mental (MCS) functioning (with items about general health, activity limits, ability to accomplish desired tasks, depression and anxiety, energy level, and social activities), burden of kidney disease subscale (with items about how much kidney disease interferes with daily life, takes up time, causes frustration, or makes the patient feel like a burden), symptoms and problems subscale (with items about how bothered a patient feels by sore muscles, chest pain, cramps, itchy or dry skin, shortness of breath, faintness/dizziness, lack of appetite, feeling washed out or drained, numbness in the hands or feet, nausea, or problems with dialysis access), effects of kidney disease on daily life subscale (with items about how bothered the patient feels by fluid limits, diet restrictions, ability to work around the house or travel, feeling dependent on doctors and other medical staff, stress or worries, sex life, and personal appearance). The scores of quality of KDQOL questionnaires are transformed onto 0 to 100 possible ranges, with higher scores always reflecting better quality of life. SF-12 can provide estimates for all eight domains, but interest more often focuses on PCS and MCS.[12] Scale scores are computed with the program on the website at www.gim.med.ucla.edu/kdqol.[13] The most commonly used utility-measuring tools are the visual analog scale (VAS), EuroQol questionnaire (EQ-5D) and Short-Form 6 Dimensions (SF-6D). Calculation of the EQ-5D utility is based on the scoring function that is derived from a UK population utility and Thai population because Thai preference weight is available now.[14,15] From the SF-12, the SF-6D utility is calculated by applying the scoring method that is also derived from UK preference scores.[16,17] Both EQ-5D and SF-6D are indirect utilities which have the advantage that they can be assessed through self-report questionnaires and are easy to understand, but the questionnaire takes a long time to complete (i.e., there are too many questions). The visual analog scale (VAS) is used as the direct well-being score. Using the VAS, the patient is asked to place a mark somewhere on a line of standard length (usually 10 cm) to record their assessment of their own state at a given time. As far as possible the two extremes are labelled to correspond to the absolute minimum and the absolute maximum assessment that could ever be experienced. However, it has been said that a VAS is more difficult for the patient to understand. The purpose of this study is the comparison of quality of life score from KDQOL-36 and utility score from EQ-5D (UK and Thai preference weight), Visual analog scale (VAS), and SF-6D (UK preference weight) between the thrice-weekly and twice-weekly dialysis in hemodialysis Thai patients.

MATERIALS AND METHODS

The study was a cross-sectional analytical study. If the patient gave informed consent, the investigator administered the study questionnaire as a face-to-face interview which included EQ-5D, VAS, and KDQOL-36 (consists of SF-12 and 3 subscales of kidney disease questionnaires), with sociodemographic and clinical data, together with a review of medical records, during April-June 2011 of 153 hemodialysis patients at the largest university hospital in Thailand (Siriraj Hospital), where the patients come from throughout Thailand. The study population was the patients who have hemodialyzed for at least 3 months but excluded the patients who are under 18 years old, changed the modality of dialysis, and those who could not answer the questionnaire or were not willing to participate in the study. The study was approved by the Siriraj Institutional Review Board (This study is a part of the topic "validity and reliability of modified KDQOL-SF v.1.3 in Thai kidney disease patients of Siriraj Hospital". This study was approved by the Siriraj Institutional Review Board (EC Number 020/2554).

Analysis

All analyses were conducted using SPSS version 13 (SPSS Inc.). Independent Student's t-test or Chi-Square test were used to compare the mean value and proportional differences of age, gender, marital status, underlying disease, hemodialysis duration, and family income, between twice-weekly and thrice-weekly hemodialysis patients who completed the KDQOL-36 (consists of SF-12 and kidney disease questionnaires) and EuroQol questionnaire. The p-value <0.05 was accepted as statistically significant.

RESULTS

The mean (SD) age of the respondent sample was 55.53 (14.26) years of age, 47.70% were male, and more than half of the respondents had at least 1 underlying disease such as hypertension (80.90%). The duration of hemodialysis was 7.49 ± 5.57 years, and most of the respondents had Civil Servant Medical Benefit Scheme (CSMBS) (48.70%). Characteristics and clinical characteristics of the patients' samples were classified by frequency of hemodialysis per week such as twice-weekly and thrice-weekly hemodialysis (Table 1).

The mean Hb for all patients were 10.30 g/dl. The mean Hb levels were 10.08 g/dl in the twice-weekly hemodialysis group and 10.49 g/dl in the thrice-weekly hemodialysis group (p = 0.121) as shown in Table 2. Hemoglobin and creatinine levels were not different between the two groups, p-value = 0.121 and 0.607, respectively. The patients who received twice-weekly hemodialysis had higher Kt/V and blood urea nitrogen (BUN) than those who received thrice-weekly hemodialysis (p-value = 0.033 and 0.001, respectively), but the albumin of the twice-weekly hemodialysis was lower than the thrice-weekly hemodialysis (p=0.001) as shown in Table 2.

The mean and SD of utility scores from SF-6D,

TABLE 1. Characteristics of patients by frequency of hemodialysis per week.

Parameter	Twice-weekly (n = 69)	Thrice-weekly (n = 84)	p-value
Age (yrs)			0.209[a]
Mean	53.9	56.9	
SD	14.7	13.8	
Gender			0.001[b]
Male	33.3% (23)	59.5% (50)	
Female	66.7% (46)	40.5% (34)	
Marital status (%)			0.026[b]
Single	18.8% (13)	22.6% (19)	
Couple	58.0% (40)	69.0% (58)	
Widow	7.2% (5)	6.0% (5)	
Divorce	15.9% (11)	2.4% (2)	
Underlying disease (%)			
Diabetes	17.4% (12)	24.1% (20)	0.313[b]
Hypertension	78.3% (54)	83.1% (69)	0.447[b]
Coronary artery disease	17.4% (12)	24.1% (20)	0.313[b]
Other	23.2% (13)	30.1% (25)	0.110[b]
Health Scheme (%)			<0.001[b]
UC	27.5% (19)	2.4% (2)	
CSMBS	24.6% (17)	67.9% (57)	
SS	24.6% (17)	14.3% (12)	
Other	23.2% (16)	15.5% (13)	
Hemodialysis duration (yrs)			0.666[a]
Mean	7.70	7.30	
SD	6.13	5.05	
Family income (Baht/month)			0.034[a]
Mean	35,405.41	60,586.60	
SD	53,481.61	55,080.32	

a: ANOVA test
b: Chi-square test

EQ-5D (UK, Thai algorithm), and VAS in the different hemodialysis weekly frequencies were not significantly differenct, (p-value = 0.709, 0.914, 0.888, and 0.654, respectively) as shown in Table 3.

The score of 3 kidney disease specific subscales in the KDQOL-36 questionnaire were transformed onto 0 to 100 scale ranges as shown in Table 4. The better overall status patients are indicated with the higher score. The differences of weekly hemodialysis frequency were not significantly different in symptom/problem, effects of kidney disease, and burden of kidney disease scores (p-value = 0.486, 0.168, and 0.133, respectively). Other than the SF-12, items included physical functioning, role limitations due to physical health and mental health problems, general health perceptions, emotional well being, social functioning, and energy/fatigue or vitality. For the two groups of patients classified according to either twice-weekly hemodialysis or thrice-weekly hemodialysis, there were no significant differences in both SF-12 measures of physical health problems and SF-12 measures of mental health problems (p-value = 0.240 and 0.122, respectively).

TABLE 2. Clinical laboratory by frequency of hemodialysis per week (Mean ± SD).

Parameter	Twice-weekly (n=69)	Thrice-weekly (n=84)	p-value
Hemoglobin (g/dl)	10.08 ± 1.65	10.49 ± 1.62	0.121
Albumin (g/dl)	2.10 ± 0.99	2.72 ± 1.29	**0.001**
Creatinine (mg/dl)	9.49 ± 7.18	9.98 ± 4.59	0.607
Kt/V	2.31 ± 0.45	2.17 ± 0.38	**0.033**
BUN (mg/dl)	76.43 ± 19.59	64.93 ± 17.15	**<0.001**

DISCUSSION

From 153 hemodialysis patients, more than half of the respondents had underlying disease (at least 1 disease) such as hypertension (80.90%). While 54.90% of patients hemodialyzed three times a week, 45.10% of patients hemodialyzed twice-weekly. Survival analysis revealed that patients dialyzed less than three times per week survived for a shorter period of time than patients receiving higher dialysis frequency, but their quality of life remained unclear.[18] There was no significant difference in quality of life from the symptom/ problem list, effects of kidney disease, burden of kidney disease, PCS, and MCS scores between twice-weekly and thrice-weekly hemodialysis, as well as the utility scores from SF-6D, EQ-5D, and VAS. On the other hand, the previous study indicated that the difference of Hb levels was statistically significantly different in the effects of kidney disease, and MCS scores.[19] Health schemes were different between the two groups

TABLE 3. Mean ± SD of utility scores and frequency of hemodialysis per week.

Parameter	Twice-weekly (n=69)	Thrice-weekly (n=84)	p-value
SF-6D	0.784 ± 0.176	0.794 ± 0.158	0.709
EQ-5D (UK)	0.811 ± 0.281	0.806 ± 0.268	0.914
EQ-5D (TH)	0.765 ± 0.272	0.759 ± 0.280	0.888
VAS	0.670 ± 0.223	0.684 ± 0.171	0.654

**EQ-5D utility based on the scoring function that was derived from a UK and Thai (TH) population utility*

TABLE 4. Quality of Life scores and frequency of hemodialysis per week.

Parameter	Twice-weekly (n=69)	Thrice-weekly (n=84)	p-value
Kidney disease specific			
Symptom/ problem list	79.74 ± 15.86	81.42 ± 13.93	0.486
Effects of kidney disease	64.86 ± 25.39	70.28 ± 22.97	0.168
Burden of kidney disease	45.38 ± 35.79	53.72 ± 32.44	0.133
SF-12			
SF-12 measure of physical (PCS)	43.99 ± 9.44	42.21 ± 9.20	0.240
SF-12 measure of mental (MCS)	49.50 ± 11.07	52.28 ± 10.95	0.122

of hemodialysis frequency ($p<0.001$). Most of the thrice-weekly hemodialysis patients were CSMBS (67.9%) because they were reimbursed for the hemodialysis expenditure while those using another scheme had to pay out of their own pocket. The thrice-weekly hemodialysis patients had higher family incomes than the twice-weekly hemiodialysis patients ($p=0.034$). From the answers of the respondents, we discovered the patients who hemodialyzed two times a week did so due to economic constraints, reimbursement policy or because the patients felt that hemodialysis interfered too much with their regular life. It was widely accepted that the higher frequency hemodialysis was associated with better survival of patients, but the patients felt that the thrice-weekly hemodialysis was not the best option for them because of the limit of the high expenditure and too much time consumed at the hospital. The higher frequency of hemodialysis led to the longer time because hemodilyzed patients had to go to the hemodialysis center and depend on medical staffs for hemodialyis which interfered with their daily life.[20-21] The limitation of this study was a non-randomized, unselected cohort study involving 153 hemodialysis patients in Siriraj Hospital which was different from other settings. A further large randomized multicenter study which studies the utility score or cost effectiveness between thrice-weekly and twice-weekly hemodialysis should be conducted.

CONCLUSION

Hemodialysis frequency between twice-weekly and thrice-weekly hemodialysis were dependent on financial support and reimbursement policy. Our results could summarize that quality of life score (SF-12 PCS and MCS functioning, burden of kidney disease subscale, symptoms and problems subscale, effects of kidney disease on daily life subscale) and utility score (SF6D, EQ-5D, and VAS) of both the thrice-weekly and twice-weekly hemodialysis Thai patients at Siriraj Hospital indicated no significant differences.

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Competing interests

The authors declare that they have no competing interests.

REFERENCES

1. Saran R, Bragg-Gresham JL, Levin NW. Longer treatment time and slower ultrafiltration in hemodialysis: associations with reduced mortality in the DOPPS. Kidney Int. 2006 Apr;69(7):1222-1228.
2. Port FK, Ashby VB, Dhingra RK, Roys EC, Wolfe RA. Dialysis dose and body mass index are strongly associated with survival in hemodialysis patients. J Am Soc Nephrol. 2002 Apr;13(4):1061-1066.
3. Charra B. From adequate to optimal dialysis long 3 x 8 hr dialysis: a reasonable compromise. Nefrologia. 2005;25 Suppl 2:19-24.
4. Okamoto K, Kobayashi S, Noiri E. Longer treatment time and slower ultrafiltration in hemodialysis: associations with reduced mortality in the Dialysis Outcomes and Practice Patterns Study. Kidney Int. 2006 Nov;70 (10):1877.
5. Eknoyan G, Beck GJ, Cheung AK. Effect of dialysis dose and membrane flux in maintenance hemodialysis. N Engl J Med. 2002 Dec;347(25):2010-2019.
6. Locatelli F, Buoncristiani U, Canaud B, Kohler H, Petitclerc T, Zucchelli P. Dialysis dose and frequency. Nephrol Dial Transplant. 2005 Feb;20(2): 285-296.
7. Hanson JA, Hulbert-Shearon TE, Ojo AO, Port FK, Wolfe RA, Agodoa LY, et al. Prescription of twice-weekly hemodialysis in the USA. Am J Nephrol. 1999 Jan;19(6):625-633.
8. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease. Am J Kidney Dis. 2006 May;47(5 Suppl 3):S11-145.
9. Williams AW, Chebrolu SB, Ing TS. Early clinical, quality-of-life, and biochemical changes of "daily hemodialysis" (6 dialyses per week). Am J Kidney Dis. 2004 Jan;43(1):90-102.
10. Lin CC, Lee BO, FD H. The phenomenology of deciding about hemodialysis among Taiwanese. West J Nurs Res. 2005;27:915-929.
11. Kalantar-Zadeh K, Unruh M. Health related quality of life in patients with chronic kidney disease. Int Urol Nephrol. 2005 Mar;37(2):367-78.
12. Ware J, Keller S. How to Score the SF-12 Physical and Mental Health Summaries: A User's Manual. Boston: New England Medical Centre; 1995. The Health Institute TH, ed. 50-75.
13. UCLA Division of General Internal Medicine and Health Services Research Available from: www.gim.med.ucla.edu/kdqol/ Accessed Dec 5, 2010.
14. Dolan P. Modeling valuations for EuroQol health states. Med Care. 1997 Nov;35(11):1095-1108.
15. Tongsiri S. The Thai population based preference scores for EQ5D health states. Bangkok: Ministry of Public Health, Thailand; 2009.
16. Brazier J, Roberts J, Deverill M. The estimation of a preference-based measure of health from the SF-36. J Health Econ. 2002 Mar;21(2):271-292.
17. Brazier JE, Roberts J. The estimation of a preference-based measure of health from the SF-12. Med Care. 2004 Sep;42(9):851-859.
18. Stankuviene A, Ziginskiene E, Kuzminskis V, Bumblyte IA. Impact of hemodialysis dose and frequency on survival of patients on chronic hemodialysis in Lithuania during 1998-2005. Medicina (Kaunas). 2010;46(8):516-521.
19. Thaweethamcharoen T, Sakulbumrungsil R, Vasuvattakul S, Nopmaneejumruslers C. Quality of life and hemoglobin levels of hemodialysis patient at Siriraj Hospital. Siriaj Med J. 2011 Jan-Feb; 63(1):12-16.
20. Suri RS, Nesrallah GE, Mainra R. Daily hemodialysis: a systematic review. Clin J Am Soc Nephrol. 2006 Jan; 1(1):33-42.
21. Rocco MV. More frequent hemodialysis: back to the future? Adv Chronic Kidney Dis. 2007 Jul; 14 (3): e1-9.