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Original Article

QUALITY OF LIFE OF CHRONIC KIDNEY DISEASE PATIENTS WITH ROUTINE HEMODIALYSIS IN GENERAL HOSPITALS IN SLEMAN YOGYAKARTA

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ABSTRACT

Objective: To elicit quality of life (QOL) of chronic kidney disease (CKD) patients with routine hemodialysis receiving erythropoietin, to compare the QOL of CKD patients with routine hemodialysis receiving different erythropoietin, and to explore the change in QOL over six months for patients managed in the hospitals.

Methods: A multicenter prospective study was conducted among adult CKD patients in Yogyakarta. QOL was measured using kidney disease quality of life–short form (KDQOL–SF™) questionnaire and a FACIT fatigue scale questionnaire. CKD patients were divided into 2 groups: those receiving erythropoietin alpha (n=74) and those receiving erythropoietin beta (n=39). Both groups were asked to complete the KDQOL–SF™ questionnaire and a FACIT fatigue scale questionnaire two times in six months range.

Results: In the first period, the average rate of the KDQOL-SF and FACIT for CKD patients receive erythropoietin alpha compared to CKD patients receive erythropoietin beta was 77.24: 80.21 and 3.35: 3.49 while in the second period, the average rate of the KDQOL-SF and FACIT for CKD patients receive erythropoietin alpha compared to CKD patients receive erythropoietin beta was 80.45: 83.95 and 3.45: 3.56.

Conclusion: Erythropoietin can improve QOL of CKD patients with routine hemodialysis, while erythropoietin beta gives more improvement, but statistically, it doesn't different significantly.

Keywords: CKD, Hemodialysis, QOL, Erythropoietin

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INTRODUCTION

CKD prevalence in all over the world predicted to reach 8–16% of the populations. CKD incidence rises every year, especially in developing countries cause of increasing life expectation age, so that people have a longer age. CKD therapy needs special treatment such as dialysis (hemodialysis or peritoneal dialysis) or renal transplantation which needs a lot of costs. Renal transplantation actually is more efficient compared to dialysis because only in one treatment can make patients avoid dialysis procedure which takes place in relatively long duration. Meanwhile, many people use dialysis to treat CKD [1].

One of CKD complication is anemia. Anemia is common in CKD patients, especially if the glomerular filtration rate (GFR)<60 ml/min and almost all CKD patients have anemia if GFR<27 ml/min. It also said that almost 50% CKD stage 3–4 patients have anemia and increase almost 75% in end-stage renal disease (ESRD) [2].

Anemia in CKD is most of the decrease erythropoietin (EPO) production, but can also because of inadequate of blood iron, inadequate of nutrition, inflammation, hyper parathyroid, excessive loss of blood, etc. Non-treated anemia can make fatigue, decrease the ability of physical activity, cognitive function, immune response and decrease the quality of life that can increase morbidity and mortality [3].

Anemia of EPO deficiency can be treated by EPO delivery, red cell transfusion or both. Most of that is with EPO delivery. The earlier research said that EPO delivery can decrease transfusion and increase patient's QOL compared with non-delivery EPO [4]. Another study reported that the total cost of anemia treatment in CKD patients with hemodialysis is cheaper with transfusion compared with EPO delivery, but patient's QOL is better with EPO delivery compared with transfusion [5].

Erythropoietin is an essential growth factor for erythroid progenitor cells, which produced mainly in the kidney [6]. Short-acting erythropoietin-stimulating agents (ESAs) that have been used for the treatment of renal anemia, such as erythropoietin alpha and erythropoietin beta have a half-life of 6-8 h when given intravenously and a half-life of 19-24 h when given subcutaneously, but more effective when administered subcutaneously. Long-acting ESAs such as darbepoetin alpha and CERA have a half-life 2-3 times than short-acting ESAs. In Indonesia, there are only short-acting ESAs used for the treatment of renal anemia.

WHO defines the QOL as a multiple dimensions concept that concerns an individual's usual or expected physical, emotional and social well-being. It will describe the design, assessment, analysis and interpretation of single and multi-item, subjective measurement scales. The broad definition will include scales or instruments that ask general questions, such as "in general, how would you rate your health now?", and more specific questions on particular symptoms and side effects, such as "during the past week have you felt nauseated?" This measurement scales all have the common feature of using a standardised approach to assessing a person's perception of their own health by using the numerical scoring system and may include one or several dimensions of QOL [7].

There are some instruments to measure fatigue scale. One of them is Functional Assessment Chronic Illness Therapy (FACIT) Fatigue Scale which was validated by Cella, *et al.* (2005) [8]. It said that the FACIT-Fatigue Scale is a brief, valid measure for monitoring important symptom and its effects of chronic illness. FACIT-Fatigue Scale consists of thirteen questions and easy to use to measure individual fatigue scale during their daily activities in last one week [9]. FACIT-Fatigue Scale is a collection of health-related quality of life questionnaires targeted to the management of chronic illness by measuring functional body system [10]. This makes us know the relation of fatigue with QOL.

MATERIALS AND METHODS

Methods

We conducted a prospective study of CKD patients with routine hemodialysis from 3 big hospitals in Yogyakarta from May 2015–March 2016. Participants were eligible if they were CKD patients with routine hemodialysis at least in three months, aged from 20–80 y and use EPO to treat their anemia. Participants with a current functioning kidney transplant or diagnosed with cancer were excluded. Using a patient database, we used purposive sampling to capture a range of demographic and clinical characteristics, including age, gender, ethnicity, work status, employment, comorbid, and kind of EPO used.

Ethical approval was obtained from medical and health research ethics committee (MHREC) faculty of medicine Gadjah Mada University with reference number KE/FK5/6/EC/2015. Patients' approvals were obtained by using informed consent forms. The surveys were administrated face to face and participants can answer the questions his/herself or with their family.

Sociodemographic and clinical information were collected from patient's medical records. The participants were asked to value their current health using KDQOL-SF and FACIT-Fatigue scale. They were asked to rate their health where QOL was measured on a scale from 0 (least preferred health state) to 100 (perfect health with no kidney disease). They were also asked to rate their fatigue scale from 0 (fatigue very much) to 4 (not fatigue at all). Participants then completed the FACIT-Fatigue scale and KDQOL–SF questionnaire, a multidimensional, a reliable and validated instrument developed for dialysis patients. They completed the questionnaire two times in approximate six-month range. The KDQOL includes the SF-36 health survey as its generic core measuring eight domains such as physical functioning, role limitation physical, role limitation emotional health, energy (vitality), emotional well-being, social functioning, pain, and general health perception; augmented with multi-scale targeted at CKD-specific concerns (symptoms and problems, effect of kidney disease, burden of kidney disease, work status, cognitive function, quality of social interaction, sexual function, sleep, social support and dialysis staff). Descriptive statistics were calculated and reported as a mean±standard deviation (SD). Then compare the mean of two groups (patients receive erythropoietin alpha with patients receive erythropoietin beta) by independent sample t-test. The analysis was conducted using statistical package for social science (SPSS) 16 version.

RESULTS

One hundred and thirteen CKD patients with routine hemodialysis from May 2015 to March 2016 provided baseline data (table 1). More than 50% of patients were male. The mean patient age was 40–60 y and more than 90% were Javanese.

The results of the FACIT-fatigue scale questionnaire in CKD patients with routine hemodialysis (n = 113) were listed in table 2. In the first period, the average rate of FACIT for CKD patients receives erythropoietin alpha compared to CKD patients receive erythropoietin beta was 3.35: 3.49 while in the second period (six months later), the average rate of FACIT for CKD patients receives erythropoietin alpha compared to CKD patients receive erythropoietin beta was 3.45: 3.56. Statistic calculation of rate of FACIT shown that compare mean of two groups (patients receive erythropoietin alpha with patients receive erythropoietin beta) was not different significantly (even in the first period or at the second period) except at question no An16 (I have to limit my social activity because I am tired), respectively (2.97±1.34 vs 3.69±0.83 [P<0.05] at the first period and 2.85±1.58 vs 3.56±1.02 [P<0.05] at the second period).

The results of the KDQOL-SF questionnaire in CKD patients with routine hemodialysis (n = 113) were listed in table 3. In the first period, the average rate of the KDQOL-SF for CKD patients receive erythropoietin alpha compared to CKD patients receive erythropoietin beta was 77.24: 80.21 while in the second period (six months later), the average rate of the KDQOL-SF for CKD patients receive erythropoietin alpha compared to CKD patients receive erythropoietin beta was 80.45: 83.95. Statistic calculation of the rate of the KDQOL-SF has shown that compare mean of two groups (patients receive erythropoietin alpha with patients receive erythropoietin beta) was not different significantly in the first period and was not different significantly in the second period, except at no A3 (Burden of kidney disease), respectively (80.41±21.95 vs 89.58±17.11 [P<0.05]) and B1 (Physical functioning), respectively (73.38±19.64 vs 82.44±13.47 [P<0.05]).

Table 1: Characteristic CKD patients with routine hemodialysis using EPO-α and EPO-β

Parameter	EPO-α (n=74)	EPO-β (n=39)
Age (years)		
20–40	16	14
40–60	39	17
>60	21	6
Gender		
Male	42	18
Female	34	19
Ethnic		
Javanese	72	36
Others	4	1
Status		
Married	68	28
Unmarried	8	9
Employment		
Work	32	18
Not work	44	19
Co-morbid		
HT	56	32
HT, DM	20	5

HT: Hypertension, DM: Diabetes Mellitus

Table 2: Results of FACIT fatigue scale questionnaire in CKD patients with routine hemodialysis

No	Statement	I		II	
		EPO-α	EPO-β	EPO-α	EPO-β
HI7	I feel fatigued	3.64±0.69	3.69±0.73	3.89±0.35	3.87±0.52
HI12	I feel weak all over	3.61±0.72	3.67±0.74	3.86±0.42	3.92±0.35
An1	I feel listless (washed out)	3.65±0.69	3.62±0.85	3.78±0.50	3.85±0.43
An2	I feel tired	3.65±0.69	3.59±0.75	3.65±0.61	3.62±0.67
An3	I have trouble starting things because I am tired	3.70±0.72	3.77±0.84	3.97±0.16	3.90±0.38
An4	I have trouble finishing things because I am tired	3.72±0.71	3.74±0.85	3.99±0.12	3.92±0.35
An5	I have energy	2.49±0.88	2.64±0.58	2.69±0.49	2.82±0.39
An7	I am able to do my usual activities	2.27±1.13	2.62±0.99	2.70±0.49	2.79±0.41
An8	I need to sleep during the day	2.51±1.21	2.77±1.31	1.82±1.48	2.13±1.32
An12	I am too tired to eat	3.96±0.20	3.97±0.16	3.99±0.12	3.97±0.16
An14	I need help doing my usual activities	3.65±0.82	3.72±0.79	3.91±0.50	3.92±0.35
An15	I am frustrated by being too tired to do the things I want to do	3.78±0.63	3.90±0.31	3.80±0.68	3.95±0.32
An16	I have to limit my social activity because I am tired	2.97±1.34	3.69±0.83	2.85±1.58	3.56±1.02

Mean+SD, EPO-α (n=74), EPO-β (n=39)

Table 3: Results of KDQOL questionnaire in CKD patients with routine hemodialysis

No	Domain	I		II	
		EPO-α	EPO-β	EPO-α	EPO-β
	CKD-targeted				
A1	Symptom/problem	93.36±8.11	90.97±9.86	95.75±5.32	96.21±5.12
A2	Effect of kidney disease	90.42±10.03	90.03±10.92	94.47±6.35	94.63±5.50
A3	Burden of kidney disease	65.46±30.41	67.79±27.15	80.41±21.95	89.58±17.11
A4	Work status	55.41±50.05	66.67±47.76	36.49±48.47	46.15±50.50
A5	Cognitive function	82.88±20.11	86.50±18.51	89.01±12.26	89.57±9.15
A6	Quality of social interaction	89.82±12.40	89.91±16.32	91.89±4.17	92.82±2.36
A7	Sexual function	41.72±47.87	51.60±49.02	41.89±48.63	55.13±49.73
A8	Sleep	75.03±19.93	77.95±16.62	77.84±14.12	80.51±14.99
A9	Social support	98.89±5.68	98.31±7.37	98.22±7.51	99.15±5.28
A10	Dialysis staff encouragement	96.45±10.45	97.44±7.13	99.16±4.31	99.04±4.43
A11	Patient satisfaction	52.74±6.85	55.23±7.95	50.46±2.78	51.72±5.15
	36-item health survey				
B1	Physical functioning	67.91±24.13	76.03±19.87	73.38±19.64	82.44±13.47
B2	Role-physical	62.50±37.76	68.59±29.09	66.72±23.25	75.00±25.65
B3	Pain	88.14±23.22	90.38±17.37	79.63±27.01	83.33±25.13
B4	General health perceptions	73.72±16.24	76.67±17.26	82.09±12.05	85.64±8.21
B5	Emotional well-being	87.84±11.44	88.92±10.56	90.22±4.40	90.46±3.96
B6	Role-emotional	77.48±36.23	76.92±34.33	95.95±10.97	94.87±12.18
B7	Social function	84.80±23.16	90.38±17.78	95.44±12.85	96.79±16.15
B8	Energy (Vitality)	82.92±11.69	82.69±13.32	89.46±7.38	92.05±6.04

Mean+SD, EPO-α (n=74), EPO-β (n=39)

DISCUSSION

A study about correction of anemia in CKD patients receives erythropoietin alpha reported that there was improvement QOL from baseline values weather in the high hemoglobin group and in the low hemoglobin group. It also showed a similar level of improvement from baseline values in both groups, except for the score for emotional role subscale of SF-36, which was significantly higher in the low hemoglobin group [11]. Other publications deliver such a better QOL due to anemia management with erythropoietin, except for two domains regards to the ability to work (work status: 34.7 become 31.7) and role limitation caused by a physical health problem (role physical: 39.7 become 39) [12]. In this study, we also found out that six months from baseline after receiving erythropoietin alpha or beta, CKD patients had better QOL almost in all domains, except in work status from 55.41 became 36.49 for erythropoietin alpha and from 66.67 became 46.15 for erythropoietin beta.

Compared to the population with end-stage renal disease (ESRD) in other countries, our data showed better scores almost in all domains as shown in fig. 1. Compared to US dialysis patients [13], Poland dialysis patients [14], and Singapore dialysis patients [15], our data showed a poor score only in sexual function. The different rate of QOL in hemodialysis patients influenced by some factors such as race [16], change in kidney function [17], stage of anemia [11], etc.

A previous publication reported that fatigue impacts patients' abilities to manage their daily activities and to remember and concentrate on conversations and what is going on around them [18] and feel isolated from others and society [19]. This makes decreasing their participation in even simple physical and mental activities for patients on dialysis. The physical domain was highly affected in CKD patients with hemodialysis [20].

Post-dialysis fatigue patients required almost five hours of sleep to recover and had more depression, insomnia, and body aches than those who did not [21]. They also had a limitation in their functional independence and participation in social activities [22]. Research suggests that fatigue may be part of a symptom complex that includes nausea, muscle cramps, and headache, which may be the result of the fluid shifts that occur during hemodialysis [23].

Another study in China that determined same inclusive criteria with this study such as receiving routine hemodialysis for at least three months, being identified as an outpatient, 18 y of age or older and willing to participate and sign written informed consent, gave a total score of the FACIT-fatigue scale 41 (average 3.15) [24]. It was not too different with the rate of this study that gives an average score of FACIT 3.36 for patients receive erythropoietin alpha and 3.49 for patients receive erythropoietin beta.

Our study has several other limitations that need to be considered. First, it was an observational study that we can't take part in patients' therapy, anemia management and patients' habit in their daily activity. Another one was hospital capacity of hemodialysis machines that influence on a number of hemodialysis patients.

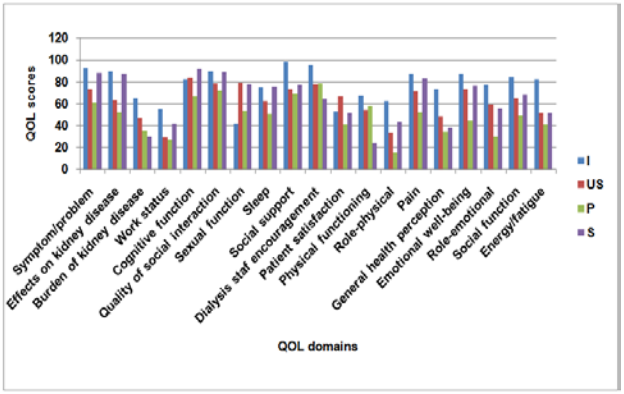

Fig. 1: Dialysis patients' quality of life scores in Indonesia, United States of America, poland and Singapore

CONCLUSION

Erythropoietin can improve the QOL of CKD patients with routine hemodialysis, while erythropoietin beta gives more improvement. CKD patients with routine hemodialysis using erythropoietin beta shown better QOL compared to CKD patients using erythropoietin alpha but overall they don't different significantly.

CONFLICT OF INTERESTS

All authors declare that they have no conflict of interest.

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