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Health-related quality of life among hemodialysis patients at El-Minia University Hospital, Egypt

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Abstract

Background Hemodialysis results in significant change in daily living, physical and psychological impairments, disruption of marital, family, and social life. Health-related quality of life (HRQOL) assessment helps to plan individual treatment strategies, and determine the efficacy, quality of medical and social care provided.

Aim The focus of the study was to assess HRQOL of hemodialysis patients attending El-Minia University Hospital dialysis unit, determine the relation between HRQOL and some sociodemograghic factors and clinical disorders and also to compare HRQOL between patients performing hemodialysis for less than and more than 5 years.

Subjects and methods The study is a cross-sectional hospital-based study that included 170 hemodialysis patients; 81 males and 89 females, mean age 46.6±14.6 years. In all 59.4 % were rural residents. Data were collected by a questionnaire which included, demographic, social and medical data. Kidney Disease Quality of Life-36 (KDQOL-36) health survey was used for assessment of HRQOL.

Results About two thirds (64 %) of the studied hemodialysis patients had physical and mental quality of life (QOL) scores below average level. HRQOL was lower in old, female, married, illiterate and non-worker hemodialysis patients. Hepatitis C positive (HCV), diabetic and anemic patients had decreased QOL scores. A longer duration of hemodialysis treatment was associated with reduced physical QOL.

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Conclusion The most important sociodemographic factors affecting HRQOL were age, sex, education, occupation and marital status. The most important clinical disorders affecting QOL were anemia, HCV infection, sleep disturbances and diabetes. Increase awareness of hemodialysis patients and their caregivers about disabilities associated with hemodialysis treatment and educational programs to decrease the problems which the patients face and to increase the QOL.

Keywords Hemodialysis · Patients · Quality of life · Egypt

Introduction

Chronic kidney disease (CKD) is a world-wide public-health problem. According to the World Health Organization, diseases of the kidney and urinary tract contribute to global burden with approximately 850,000 deaths every year and more than 115 million disability-adjusted life years. CKD represents the 12th leading cause of death and 17th leading cause of disability (WHO 2008).

The prevalence of dialysis patients in Egypt have increased from 10 per million population (pmp) in 1974 to 225 pmp in 1996 (Barsoum et al. 1996), and then from 403 pmp in 2003 to 483 in 2004 (Afifi 2008). The prevalence rate of ESRD in the El-Minia Governorate increased from 250 pmp in 2002 (El-Minshawy et al. 2002) to 260 pmp in 2005 (El-Minshawy and Kamel 2010), and had become 367 pmp in 2007 (El-Minshawy 2011).

Hemodialysis therapy is time-intensive, expensive and requires fluid and dietary restrictions. Long-term dialysis therapy itself often results in loss of freedom, the burden of coping with an incurable disease, dependence on caregivers, disruption of marital, family, and social life and reduced or complete loss of financial income. Due to these reasons, physical, psychological, socioeconomic and environmental aspects of life are impaired (Sathvik et al. 2008).

One of the main points when treating patients with end-stage renal disease (ESRD), whose cure is not a realistic goal, is maximizing functioning and well-being, which refers to the ability to perform various daily activities and functions, and to support the patient in finding enjoyment in life. Patient assessments of functioning and well-being, which is referred to as HRQOL, also includes general health perception in each of three domains: physical, psychological and social (Kutner 2007).

Previous studies from various countries have been performed to find factors that affect the HRQOL of patients with ESRD. Although there are some inconsistencies between their results—overall physical factors; psychosocial factors such as marital status, depression, and anxiety levels; sociodemographic and clinical factors such as age, gender, duration of renal disease and dialysis, comorbid physical illnesses (e.g. diabetes)—all seem to have a significant effect on HRQOL (Kimmel and Patel 2007). 'Adding life to years and not just years to life' is as true for ESRD patients as for anyone else; thus, attaining a good health-related quality of life (HRQOL) in these patients is a difficult task, requiring significant efforts from nephrologists and support from social workers and psychologists (Seica et al. 2009).

This study was conducted to assess the quality of life (QOL) of hemodialysis patients and to determine the relation between QOL and some medical disorders (such as anemia, hypertension, diabetes mellitus and being hepatitis C positive (HCV). It also includes a comparison between patients performing dialysis for less than and more than 5 years.

Subjects and methods

This is a cross-sectional hospital-based descriptive study conducted to assess the QOL of hemodialysis patients and was carried out in the dialysis unit of El-Minia University Hospital during the period from January to June 2011. The El Minia Governorate is one of the Upper Egypt governorates and is 240 km to the south of Cairo. Approval was granted by the director of the El-Minia University Hospital dialysis unit and from the Head of the Department of Internal Medicine to obtain data from the hemodialysis patients and the results of some investigations regarding the patients to be included in the study.

This study was conducted among 170 hemodialysis patients (all hemodialysis patients attending El-Minia University Hospital dialysis unit during the period from 1st January to 30th June 2011) who agreed to be interviewed and to participate in the study; the response rate was 98 %. Patients who have undergone renal dialysis for less than 3 months, and patients who were admitted to the hospital

were excluded from the study. Data were collected by a well-structured questionnaire, every participant in the study was interviewed in the dialysis unit by the researchers who took their answers and explained the aim of the study. The questionnaire included demographic data, social data, history of medical disorders, duration of dialysis treatment, clinical and laboratory data.

Quality of life was assessed by using a kidney-disease-specific measure of HRQOL known as the Kidney Disease Quality of Life-36 (KDQOL-36) survey which includes the 12- Item Short Form (SF-12) health survey plus kidney-disease-specific scales (Stec et al. 2008). The first 12 items of the KDQOL-36 are the Medical Outcomes Survey (MOS) SF-12 survey, which measures patients' perceptions of their own physical and mental functioning. In addition, there are 24 kidney-disease specific questions. The KDQOL-36 survey consists of five scales:

1. **SF-12: physical component summery (PCS)** includes:
   - Physical function: the patient can perform moderate activities such as moving a table or climbing several floors of stairs
   - Physical role: refers to limitations due to physical health problems
   - Pain and questions as to what degree pain interferes with normal work
   - General health perception and how the patient thinks about his or her health

2. **SF-12: mental component summery (MCS)** includes:
   - Emotional wellbeing
   - Emotional role: refers to the role of limitations due to emotional health problems
   - Social function: the extent that physical health or emotional problems interfere with normal social activities with family, friends, or groups of people
   - Energy and fatigue: whether the patient has a lot of energy or feels fatigued

3. **Burden of kidney disease** (questions 13–16):
   Includes items about how much kidney disease interferes with daily life, takes up time, causes frustration, or makes the respondent feel like a burden to his or her family.

4. **Symptoms and problems** (questions 17–28):
   Assesses the extent a patient has been bothered (not at all, somewhat, moderately, very much and extremely) by symptoms during the last 30 days and includes items relevant to patients with kidney disease such as how bothered a respondent feels by sore muscles, chest pain, cramps, itchy or dry skin, shortness of breath, faintness/dizziness, lack of appetite, feeling exhausted or drained, numbness in the hands or feet, nausea, upset stomach or problems with dialysis access.

5. **Effects of kidney disease on daily life** (questions 29–36): Includes items about how bothered the respondent feels by fluid limits, diet restrictions, ability to work around the house, ability to travel, feeling dependent on doctors and other medical staff, stress or worries caused by kidney disease, sex life and personal appearance.

Scores are reported separately for each of the five KDQOL-36 scales. Results are summarized into the MCS scale, the physical component summary PCS, and the kidney disease component summary KDCS scores; the latter being a simple sum of the scores for kidney-specific questions with higher scores showing better QOL. Patient subscale scores and their QOL are divided into three groups (thirds):

1. More than 1 SD above the mean is "above average"
2. The mean +/− 1 SD is "average"
3. More than 1 SD below the mean is "below average" (Schatell and Witten 2008)

Statistical analysis

The statistical program SPSS for Windows, version 13, was used for data analysis. Quantitative data were presented by mean and standard deviation, while qualitative data were presented by frequency distribution, chi squared test, student t test, one-way ANOVA test. In addition, multiple regression analysis was used to show the combined effect of different independent variables on the target (dependant variable). The probability of less than 0.05 was used as a cut-off point for all significant tests

Ethical consideration

Following ethical guidelines of epidemiological research, a written informed consent was developed and attached to all questionnaires. An explanation regarding the objectives of the study and details of the collected data was given to each subject. Subjects were also assured confidentiality, which was maintained by removing the names of the subjects from data collection forms whereby only numbers were kept for identification. The study protocol was approved by the standard ethics of the El-Minia University ethics committee for human experimentation.

Results

There were 81 males (47.6 %) and 89 females (52.4 %) among the studied sample as shown in (Table 1). About a quarter of the sample (22.4 %) were in the age group ≥60 years and 76 (44.7 %) of the patients had ≥5 years duration of dialysis. About half (52.9 %) of hemodialysis patients were married,

Table 1 The relationship between socio-demographic characteristics and sex among the studied hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

Socio-demographic characteristics	Sex			p
	Male n (%)	Female n (%)	Total n (%)	
Age group (years)				
<60	71 (87.7 %)	61 (68.5 %)	132 (77.6 %)	0.003
≥60	10 (12.3 %)	28 (31.5 %)	38 (22.4 %)	
Duration of dialysis (years)				
<5	44 (54.3 %)	50 (56.2 %)	94 (55.3 %)	0.8
≥5	37 (45.7 %)	39 (43.8 %)	76 (44.7 %)	
Marital status				
Single	21 (25.9 %)	16 (18 %)	37 (21.8 %)	0.0001
Married	55 (68 %)	35 (39.3 %)	90 (52.9 %)	
Divorced	1 (1.2 %)	7 (7.9 %)	8 (4.7 %)	
Widow	4 (4.9 %)	31 (34.8 %)	35 (20.6 %)	
Education level				
Illiterate	21 (25.9 %)	51 (57.3 %)	72 (42.4 %)	0.0001
Literate	14 (17.3 %)	15 (16.9 %)	29 (17.1 %)	
Below university	33 (40.7 %)	19 (21.3 %)	52 (30.6 %)	
University and above	13 (16 %)	4 (4.5 %)	17 (10 %)	
Occupation				
Unemployed	57 (70.4 %)	81 (91 %)	138 (81.2 %)	0.003
Manual	14 (17.3 %)	2 (2.2 %)	16 (9.4 %)	
Clerk	9 (11.1 %)	5 (5.6 %)	14 (8.2 %)	
Professional	1 (1.2 %)	1 (1.1 %)	2 (1.2 %)	
Residence				
Urban	37 (45.7 %)	32 (36 %)	69 (40.6 %)	0.197
Rural	44 (54.3 %)	57 (64 %)	101 (59.4 %)	
Smoking				
Non-smoker	15 (18.5 %)	89 (100 %)	104 (61.2 %)	0.0001
Smoker	40 (49.4 %)	0 (0 %)	40 (23.5 %)	
Ex-smoker	26 (32.1 %)	0 (0 %)	170 (100 %)	
Total	81 (100 %)	89 (100 %)	170 (100 %)	

68 % of males compared to 39.3 % of females, and 4.9 % of males compared to 34.8 % of females were widows. There was a highly significant difference between males and females regarding educational level ($p=0.0001$).

Table 2 shows mean and median scores of the components of the (KDQOL-36) survey. The physical component scale had the lowest score (27.67 ± 7.12) followed by the mental component (35.72 ± 7.07), while the kidney disease component had the highest score (41.99 ± 13.33). This means that physical QOL was more impaired than mental and kidney-disease related aspects of QOL in dialysis patients. Regarding the physical component, physical role, which refers to limitations due to physical health problems such as limitations in the kind of work that could performed or in other activities, scored the lowest (4.71 ± 26.23); conversely, physical function, which refers to the ability to

Table 2 Mean and median health-related quality of life scores among the studied hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

Component	Subscale	Mean ± SD
Physical component summary	Physical function	39.41±58.88
	Physical role	4.71±26.23
	Pain	27.65±24.93
	General health	17.06±18.73
	Total	27.67±7.12
Mental component summary	Emotional wellbeing	93.29±37.18
	Emotional role	15.88±46.61
	Social function	26.62±32.54
	Energy/fatigue	26.47±11.01
	Total	35.72±7.07
Kidney disease component summary	Symptoms and problems	57.73±15.08
	Effects of kidney disease	36.19±20.19
	Burden of kidney disease	10.96±10.75
	Total	41.99±13.33

perform moderate activities such as moving a table or climbing stairs, scored the highest. Regarding the mental component, emotional role, which refers to limitations due to emotional health problems such as the patient accomplished less than he or she would have liked and was not able to work or do other activities as carefully as usual, scored the lowest (15.88±46.61); conversely, the highest score (93.29±37.18) was attributed to emotional wellbeing, which includes feeling peaceful, calm, downhearted or depressed. Regarding the kidney disease component, the burden of kidney disease had the lowest score (10.96±10.75). This component refers to the extent kidney disease interferes with daily life, takes up time, causes frustration, or makes the patient feel like a burden to his or her family; on the other hand, symptoms and problems, including sore muscles, chest pain, cramps, itchy skin, shortness of breath, faintness, lack of appetite, feeling exhausted, numbness in the hands or feet, nausea and problems with dialysis access, scored the highest (57.73±15.08).

Table 3 The relationship between socio-demographic characteristics and health-related quality of life components in hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

	PCS	p	MCS	p	KDCS	p
Age group						
<60 years	29.2±7.3	0.01	36.4±7.4	0.001	44.3±15.5	0.001
≥60 years	22.2±1.8		33.2±4.8		33.8±8.5	
Sex						
Male	29.3±7.99	0.004	35.9±6.8	0.6	45.47±14.46	0.001
Female	26.18±5.88		35.5±7.3		38.82±11.39	
Duration of dialysis						
<5 years	28.9±7.3	0.009	36.02±7.3	0.5	43.2±14.1	0.2
≥5 years	26.1±6.4		35.3±6.7		40.5±12.2	
Education						
Illiterate	25.12±5.8	0.0001	34.22±5.8	0.03	37.05±11.19	0.001
Literate	25.07±6.19		34.52±7.9		41.38±10.01	
Below university	31.67±6.91		35.62±7.01		47.24±15.52	
University and above	30.61±8.01		39.27±8.9		47.92±11.84	
Marital status						
Single	32.31±5.66	0.0001	38.47±8.48	0.03	47.55±12.67	0.001
Married	27.41±7.69		35.38±6.38		42.58±14.03	
Divorced	28.27±5.72		35.8±10.3		38.67±10.77	
Widow	23.27±3.59		33.6±5.5		35.36±9.56	
Residence						
Urban	29.03±8	0.03	35.58±6.9	0.83	44.3±13.5	0.06
Rural	25.73±6.3		35.81±7.2		40.4±13.02	
Occupation						
Unemployed	26.65±6.46	0.0001	35.95±6.8	0.002	40.48±12.82	0.0001
Manual	33.25±8.93		32.8±6.63		51.89±13.48	
Clerk	29.07±5.67		34.38±6.9		42.19±9.37	
Professional	43.29±9.04		52.7±4.86		66.15±24.3	
Caregiver						
Not available	26.27±6.5	0.46	35.64±7.6	0.96	33.5±11.2	0.01
Available	27.78±7.18		35.7±7.04		42.69±13.28	

PCS physical component summary; *MCS* mental component summary; *KDCS* kidney disease component summary

Male patients had higher physical QOL (29.3±7.99) and kidney disease QOL scores (45.47±14.46) than female patients (26.18±5.88 and 38.82±11.39 respectively), while there was no significant difference as regards mental QOL (Table 3). The duration of hemodialysis treatment negatively affected physical QOL as patients with a longer duration of hemodialysis treatment (>5 years) had a lower physical component score than those with a shorter duration of hemodialysis (26.08±6.47 compared to 28.94±7.39 respectively). Illiterate patients and those who can read and write had significantly lower scores regarding the physical, mental and kidney disease components than the more educated patients. Single patients had the highest score in physical (32.31±5.66), mental (38.47±8.48) and kidney disease components (47.55±12.67). Unemployed patients had the lowest score in physical (26.65±6.46) and kidney disease components (40.48±12.82), while professional patients had the highest scores for each of the physical, mental and kidney disease component scores (43.29±9.04, 52.7±4.86 and 66.15±24.3 respectively).

Medical diseases may affect HRQOF components in hemodialysis patients; Table 4 shows that diabetic patients (n=36; 21.17 %) had significantly lower physical, mental and kidney disease component scores (21.67±5.99, 33.35±5.73 and 37.18±9.38 respectively) than non-diabetic patients (28.2±7.32, 36.36±7.27 and 43.28±13.96 respectively). Anemic patients (n=136; 80 %) had lower scores as regards physical and kidney disease component scores (23.77±3.76 and 37.99±11.38 respectively) than non-anemic patients (31.74±7.53 and 46.19±13.99 respectively). In addition, hepatitis C positive patients (n=103; 60.6 %) had significantly lower scores as regards the physical and kidney disease components (26.22±6.47 and 40.52±13.1 respectively) than hepatitis C negative patients (29.89±7.54 and 44.25±13.47

respectively; however, no significant difference as regarding mental component score (p=0.6) was found. There was a significant relationship between sleep disturbances (n=126; 74.1 %) and HRQOL including physical, mental and kidney disease component scores (p=0.0001).

Multiple regression analysis showed that the most contributing socio-demographic and clinical factors affecting physical component scores among the studied hemodialysis patients were hemoglobin level, age and HCV, while the least contributing factors were education and residence (Table 5). Moreover, the most contributing socio-demographic and clinical factors affecting mental component scores among the studied hemodialysis patients were sleep disturbances and diabetes, while the least contributing factors were education and marital state (Table 6). In addition, the most contributing socio-demographic and clinical factors affecting the kidney disease component score among the studied hemodialysis patients were sleep disturbances and hemoglobin level, while the least contributing factors were education and occupation (Table 7).

Discussion

This cross-sectional hospital based study was conducted to assess the HRQOL and its relation to the socio-demographic characteristics and some clinical disorders among 170 hemodialysis patients attending El-Minia University Hospital dialysis. The age distribution of the studied patients ranged between 18 and 80 years old, 22.4 % of them were in the 60 years or more age group and 44.7 % had been on hemodialysis for 5 years or more. The mean age was 46.62±14.59 and the study group consisted of (47.6 %) males and (52.4 %) females, which is similar to the mean

Table 4 Medical diseases and health-related quality of life components in hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

	PCS	p	MCS	p	KDCS	p
Diabetes mellitus						
Diabetic	21.6±5.9	0.01	33.35±5.7	0.02	37.18±9.4	0.01
Non-diabetic	28.2±7.3		36.36±7.3		43.3±13.9	
Anemia						
Anemic	23.7±3.7	0.0001	35.06±6.6	0.21	37.9±11.4	0.0001
Non-anemic	31.7±7.5		36.4±7.5		46.2±13.9	
Hepatitis C						
Positive	26.2±6.5	0.001	35.5±6.3	0.6	40.5±13.1	0.04
Negative	29.8±7.5		35.99±8.2		44.2±13.5	
Sleep disturbances						
Positive	25.9±6.4	0.0001	34.01±5.7	0.0001	38.7±11.7	0.0001
Negative	32.2±6.9		40.3±8.35		50.8±13.6	
Hypertension						
Hypertensive	26.86±6.2	0.28	37.1±6.01	0.05	44.6±13.3	0.05
Non-hypertensive	28.1±7.6		34.9±7.5		40.5±13.2	

PCS physical component summary; *MCS* mental component summary; *KDCS* kidney disease component summary

Table 5 Multiple regression analysis of socio-demographic and clinical factors affecting the physical component among the studied hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

Socio-demographic/clinical factors	Beta	p
Hemoglobin level	0.48	0.0001
Age	−0.366	0.0001
Hepatitis C	0.155	0.006
Occupation	0.138	0.01
Marital state	0.133	0.07
Sex	−0.083	0.15
Diabetes	0.063	0.23
Sleep disturbances	0.056	0.35
Dialysis duration	−0.034	0.63
Education	−0.017	0.76
Residence	−0.01	0.85

Dependent variable is physical component score

$R^2 = 0.62$; F change=21.28; Sig. F change=0.0001

age found by a previous study about hemodialysis patients carried out in the El Minia government which showed that the mean age was 46±13 and males outnumber females (El-Minshawy 2011).

This study showed that ESRD patients on dialysis treatment had lower QOL scores; as PCS, MCS and KDCS scores were below the average values in 64 % of patients. This is in agreement with Amer et al. (2011) who studied QOL and functional-level assessment in Egyptian patients on chronic hemodialysis treatment and found that chronic hemodialysis significantly impaired physical and mental QOL. Our study demonstrated that PCS scores were lower than MCS scores and KDCS; in other words, despite the worsening of the physical health status, the mental health of dialysis patients is relatively preserved (Seica et al. 2009; Kim et al. 2012). This may be explained by the dynamic adaptation of patients' expectations to their chronic illness (Brady et al. 2003).

Table 6 Multiple regression analysis of socio-demographic and clinical factors affecting the mental component among the studied hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

Socio-demographic factors/clinical factors	Beta	p
Sleep disturbances	0.364	0.0001
Diabetes	0.128	0.04
Occupation	−0.124	0.1
Age	−0.113	0.2
Education	0.049	0.5
Marital state	0.033	0.7

The dependent variable is the mental component score

$R^2 = 0.2$; F change =6.66; Sig. F change=0.0001

Table 7 Multiple regression analysis of socio-demographic and clinical factors affecting the kidney disease component among the studied hemodialysis patients attending El-Minia University Hospital dialysis unit from January to June 2011

Socio-demographic factors/clinical factors	Beta	p
Sleep disturbances	0.237	0.003
Hemoglobin level	0.206	0.006
Diabetes	0.117	0.09
HCV infection	0.107	0.12
Age	−0.14	0.16
Caregiver	0.095	0.18
Sex	−0.099	0.2
Marital status	0.1	0.3
Education	0.03	0.7
Occupation	0.01	0.8

The dependent variable is the kidney disease component score

$R^2 = 0.33$; F change =6.98; Sig. F change =0.0001

This study showed that the subscale burden of kidney disease had the lowest score as compared with the other specific subscales of KDCS. This is can be explained in that the burden subscale assesses perceptions of frustration and interference of the disease in the life of every person, independent of symptoms or adaptation to the effects of the disease in their daily life (Fukuhara et al. 2003), which is consistent with another study by Unruh et al. (2005).

As regards the relation between QOL scores and socio-demographic and clinical factors, it was observed from this study that age had a significant influence on physical and mental QOL; as young patients had higher PCS, MCS and KDCS scores than old patients (≥60 years). This is in agreement with Lessan-Pezeshki and Rostami (2009) who studied contributing factors in HRQOL of ESRD patients in Iran using KDQOL-SF and found that there was a significant negative effect for old age on each of PCS, MCS and KDCS.

Duration of dialysis treatment plays an important role affecting the QOL of hemodialysis patients. This study found that longer duration on hemodialysis treatment (≥5 years) was associated more with lower physical QOL scores than shorter duration (>5 years) of treatment but had no significant effects on both mental and kidney-disease-related aspects of QOL, which is in agreement with Bohlke et al. (2008) who found that higher scores in the physical QOL occurred among patients who had been on dialysis for shorter lengths of time. Moreover, Pakpour et al. (2010) found that patients with a longer duration of hemodialysis suffered from poorer physical QOL but experienced no significant decrease in mental QOL.

A higher educational level was associated with higher PCS, MCS and KDCS scores, which is in agreement with a study in Egypt (Assal et al. 2006) and another study in Saudi

Arabia (Bayoumi et al. 2009). These results are explained by the role of higher education in raising the awareness of the patients about the nature of chronic diseases and providing better coping ability regarding problems of hemodialysis treatment. On the other hand, AL-Jumaih et al. (2011) found that QOL scores were not significantly affected by level of education. Possibly, highly educated patients always hope for better QOL and state of health which makes them unsatisfied with their physical and mental health.

This study found that rural patients had lower PCS scores than urban patients. These results are in agreement with another study (Sathvik et al. 2008) and these results may be explained by the fact that rural residents in Egyptian community depend on their physical strength to do indoor and outdoor activities and hemodialysis markedly impairs their physical function.

Diabetic patients had lower MCS and KDCS than non-diabetic patients, which is in agreement with Seica et al. (2009) who found that the presence of diabetes was a significant factor for worsening the physical functioning. Furthermore, Anees et al. (2011) studied dialysis-related factors affecting QOL in hemodialysis patients in Pakistan and found that non-diabetic patients on hemodialysis had better QOL in physical health as compared to diabetic patients.

The current study found that anemic patients had lower scores as regards physical and kidney disease components than non-anemic patients, which is in agreement with Arogundade et al. (2005) who assessed QOL of hemodialysis patients in Egypt and found a positive correlation between HRQOL and hemoglobin concentration. Hepatitis C positive patients had significant difference in physical and kidney disease QOL but no significant difference regarding mental QOL. This can be explained by adaptation to chronic illness over time, which is in agreement with Afsar et al. 2009 who studied QOL of hemodialysis patients using SF-36 in Turkey and found that HCV positive patients had lower PCS and MCS scores than negative patients. There is significant effect of sleep disturbances on physical, mental and kidney-disease-related aspects of QOL and this is in agreement with Elder et al. 2008 who studied sleep quality that predicts QOL and mortality risk in hemodialysis patients and found that higher sleep quality scores were significantly associated with higher MCS and PCS scores.

Using multivariable regression analyses of sociodemographic and clinical factors affecting the PCS and MCS among hemodialysis patients, this study found that age, anemia and hepatitis C infection are negative predictors of physical QOL score, while sleep disturbances, diabetes and occupation are negative predictors of mental QOL. Multivariable regression analyses by Kao et al. (2009) showed that older age was significantly inversely associated with PCS but not with MCS. Moreover, in the study of predictors

of QOL in hemodialysis patients by Bayoumi et al. (2009), multiple regression analysis demonstrated that age, dialysis duration, and male gender were negative predictors of QOL score.

According to Vasilieva (2006) who studied the QOL in chronic hemodialysis patients in Russia, linear regression analysis showed that duration of dialysis was a significant independent predictor of low PCS in hemodialysis patients. Chiang et al. (2004) studied the QOL on 497 Taiwanese hemodialysis patients in five hospitals using the SF-36 questionnaire. They found that male gender, age <50 years old, higher education level, marriage status, employment status and non-diabetic patients were all predictors of better PCS.

The limitations to this study include the cross-sectional design of the study which did not allow us to consider temporary trajectories of QOL, the small sample size and the use of only one clinical site. Replication using a larger sample from a number of sites with a longitudinal design and better control for extraneous variables is recommended. In conclusion HRQOL of hemodialysis patients is impaired. The most important sociodemographic factors affecting HRQOL were age, sex, education, occupation and marital status. The most important clinical disorders affecting QOL were anemia, HCV infection, sleep disturbances and diabetes.

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