Quality of Life of Caregivers and Patients Undergoing Haemodialysis at Ministry of Health, Jordan

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Abstract

Quality of life (QOL) has become an important aspect in assessing the burden of chronic disease. A cross-sectional study was conducted from August to November 2010 at Ministry of Health (MOH), Jordan. The aims of the study were; to measure the patients' and caregivers' QOL, and subsequently to compare QOL of patients and caregivers with general population. RAND 36-Item Health Survey 1.0 Arabic version was used to assess the QOL. One hundred thirty-eight patients and forty-nine caregivers were involved in the study. Patients' QOL score was less than their caregiver and both have poorer QOL compared to general population. Patients' and caregivers' Physical Component Summary (PCS) were negatively correlated with their age. Moreover, caregivers' Mental Component Summary (MCS) was negatively correlated with their age. Single patients have higher PCS than married and widowed. Working patients have higher PCS than not working and retired. However there was no correlation between patients' and caregivers' QOL. In conclusion, patients' and caregivers' QOL were found to be considerable impaired compared to general population.

Key words: haemodialysis, Quality of life, RAND 36-Item Health Survey 1.0, PCS, MCS.

Introduction

Chronic Kidney Diseases (CKD) which affects 5-10% of the world population has become a global public health concern (Lysaght, 2002; Eknoyan et al., 2004; El Nahas, 2005; Brenner, 2008; Kidney International Organization, 2009). CKD influences 50 million patients worldwide (Dirks et al., 2005). As the number of patients with CKD grows, their global burden will also grow as will premature mortality and morbidity in addition to the poor quality of their life (Schoolwerth et al., 2006).

The National Kidney Foundation (NKF) has classified CKD into five stages according to the severity of the chronic kidney disease. The fifth stage is the patient who already has End Stage Renal Disease (ESRD) and has to start dialysis, or transplant. In a survey done by National Health and Nutrition Examination Survey (NHANES 3) in USA, they found that 64% of CKD are in stage 1, 31% in stage 2, 4.3% in stage 3, 0.2% in stage 4, and finally 0.02% in stage 5 (El Nahas, 2005). When the function of the kidney become irreversible, the patient reaches the ESRD, and has to start Renal Replacement Therapy (RRT) (Mowatt et al., 2003).

There is no accurate number for ESRD patients worldwide. In a survey including 120 countries representing 92.4% of the world population, there were 1.479 million patients with ESRD in 2001, and the prevalence rate was 185 per million populations (pmp) (Moeller et al., 2002).

RRT is carried out by haemodialysis, peritoneal dialysis, or renal transplant with haemodialysis as the most common modalities. Haemodialysis is a time consuming, and costly treatment. It needs more restrictions for diet and fluid, and long run dialysis causes a loss of freedom, reliance on caregiver, disturbance of marriage, family, social live, and reduction or lack of income. All these factors impair Quality Of Life (QOL) (Mollaoglu, 2006; Sathvik et al., 2008).

Many studies found that Chronic Kidney Failure (CKF) patients complain of depression, and other mental symptoms. On the other hand, little is known about patients and caregivers' health problems and their QOL (Shimoyama et al., 2003).

Quality of life is an important indicator of health and well-being, it determines the effectiveness of treatment, decide the priority for resources distribution, and help in policy developments (Karen et al., 2008). Since chronic disease is not curable, the aim is to improve the well-being of patients and prolong life without symptoms, thus QOL is used to evaluate the outcome of treatment given. In addition, QOL gives information about other symptoms that are equally or more important to patients' perspective and establishes information about the range of problems that affect the patients. Furthermore, QOL reflects the patients' preference (Fayers & Machin, 2007).

Chronic Kidney Disease is a very tense condition which causes a wide variety of complication (Bapat et al., 2008). In addition, its treatment causes significant changes in the daily lives of patients, and affects their QOL. Impaired QOL can be related to CKD itself and its treatment (Preedy & Watson, 2010). Haemodialysis is not a cure for CKD but helps to prolong and improve patients' QOL (Fayers & Machin, 2007; Karen et al., 2008). Moreover, the development of knowledge on renal physiology and the treatment of various kidney diseases have prolonged the life and improved patients' QOL (Fayers & Machin, 2007; Bapat et al., 2008).

The main goal of ESRD treatment is to improve QOL. Despite the advance in its treatment, the patients' QOL is still lower than general population (Valderrabano et al., 2001; Frank et al., 2003; Cleary & Dernann, 2005), and even lower than patients with other chronic illness (Loos et al., 2003). In addition, the caregivers are more likely to have health problems than non caregiver. According to Ho et al (2005), 35% of caregiver complains of health problems.

To date, there has been no study to evaluate QOL for patients treated by haemodialysis and their caregivers in Jordan. Nothing is known about the challenges, stress, and disability faced by the patients as well as their caregivers. Batieha et al. (2007) recommended evaluation of QOL for both patients and caregivers in order to fulfil these needs and requirements. Therefore, the result of this study is useful for health care planner to illustrate the impact of haemodialysis treatment on QOL of patients' and caregivers' and make suggestions to improve the condition.

Methodology

A cross-sectional study was carried out to evaluate the QOL for patients and informal caregivers' using RAND 36-Item Health Survey 1.0 Arabic version questionnaire. The results were then compared to the general population. Unfortunately, there is no research in Jordan which studies the QOL of general population using Short form-36 (SF-36). So the comparison was done with a neighbouring country similar in culture, beliefs, and socioeconomic status, which is Lebanon and Saudi.

The study was carried out in MOH hospitals in Jordan. Jordan is an Arab country with an area of 89.2 thousands square kilometres (Royal Jordanian Geographic Centre, 2009). It is a low middle income country with a population of 6.113 million in 2010 (Department of Statistics-Jordan, 2010). Gross Domestic Product (GDP) was Jordan Dinar (JD) 19,527.9 Million (US$27,534 Million) and GDP per capita was JD3196 (US$4474) for the year 2010 (Central Bank of Jordan, 2010). Life expectancy was 71.6 and 74.4 years for males and females, respectively (MOH-Jordan, 2010). The percent of total expenditure on health was 9.3% of the GDP (WHO, 2009).

Ministry of Health-Jordan has 22 hospitals which offer haemodialysis services for ESRD patients (MOH, 2010). Three hospitals were purposely chosen for the sampling based on two criteria: the geographic regions (north, centre, and south) and the ratio of patient to dialysis station. In Jordan the range was from two to six patients per dialysis station. The hospitals which were chosen were Al-Bashir Hospital from the centre region with a ratio of 6, Jarash Hospital from the north region with a ratio of 4, and Ghor Al-Safi Hospital from the south region with a ratio of 2.

Al Bashir Hospital serves 105 patients on regular haemodialysis as outpatient using 25 machines. Three shifts of patients are carried out from 07.00 until 23.00. Jarash Hospital serves 53 patients using 15 machines. Two shifts of patient were dialyzed from 07.00 until 18.00. Finally, Ghor Al Safi Hospital which serves 17 patients using 5 machines from 07.00 until 18.00. All haemodialysis units work 6 days/week and Friday is the off day.

Patients were selected according to specific inclusion and exclusion criteria. The inclusion criteria for patient were: patients who were over 18 years of age, diagnosed as ESRD and had been on regular haemodialysis at MOH for more than three months. Exclusion criteria were patients who were too sick to give information, and patients and caregivers who refuse to give consent.

The minimum sample size was 47 for each group, patients and caregivers. The total number of patients in the three hospitals was 175. All patients and their caregivers who met the criteria were asked to complete the questionnaire.

Quality of life for both the patients and their caregivers was evaluated by RAND 36-Item Health Survey 1.0 Arabic version questionnaire. The RAND 36-item questionnaire is a health survey which includes one multi-item scale measuring each of the following health concepts; physical functioning, role limitation because of physical health problems, bodily pain, social functioning, general mental health, role limitation because of emotional problems, energy/ fatigue and general health perception. Arabic language version is reliable and it is similar to the English language version (Coons et al., 1998).

Statistical Package for Social Sciences (SPSS) version 11.5 was used for data analysis. The research had obtained the approval from the Universiti Kebangsaan Malaysia Medical Centre Ethical Committee and from MOH-Jordan. The researcher explained the purpose of the study to health workers, patients, and caregivers. The data which was confidential was collected, stored and used for research purposes only. Furthermore, formal consent signed by the participants (patients and caregivers) was obtained before completing the questionnaires.

RESULTS

In Jordan, there were 72 hospitals providing haemodialysis treatment for 2890 patients in 2010. MOH provided haemodialysis service for 722 patients (25% of the total patients in Jordan) through 22 hospitals (MOH-Jordan, 2010).

Numbers of patients and caregivers who answered QOL questionnaire were 138 and 49, respectively. Cronbach alpha for patients for all scales together was 0.81 and for caregiver was 0.81.

The patients' QOL scores were very low (below 50) for all scales. The highest score was on bodily pain (49.51) and the lowest was on role physical function (7.79). On the other hand, the highest score for caregivers was for physical function (73.52) and the lowest was on role emotion (28.65). In general, the caregivers' scores were higher than the patients and patient' PCS and MCS were similar, but the caregiver PCS was higher than MCS (table 1).

Kolmogorov-Smirnov and Shapiro-Wilk tests were used to check the normality of continuous variables. Age, PCS, and MCS variables were normally distributed for both patients and caregivers. However, duration on dialysis was not normally distributed.

Table 2 showed the results of Pearson and Spearman tests for duration on dialysis, age of patient and caregiver with their QOL. There was a highly negative statistical correlation difference between patients' age and their PCS (r = -0.379, p= 0.001). So, as the patients age increase his PCS will reduce. For MCS, there was no significant relation between patient age and his MCS (r = -0.096, p= 0.26). In addition, there was a highly significant negative correlation between caregivers' age and their QOL in PCS (r = -0.373, p = 0.008) and MCS (r= -0.293, p = 0.04), so as the caregiver's age increase, his PCS and MCS will decline. However, the duration on dialysis was not significantly correlated with MCS and PCS of patients.

Independent T-test was used to compare the QOL scores between male and female for patient and caregiver (Table 3). The patient' and caregiver' T-test showed that there was no significant difference between male and female in their score of PCS and MCS.

Table 4 demonstrates the result of ANOVA test for education level, marital status and employment status in relation to QOL (PCS and MCS). The result of ANOVA for patients' showed a highly significant difference between the marital status of the patient and their PCS (p=0.002). The highest PCS was in single (mean 39.0, SD 8.30) and the lowest was in divorced (mean 30.3 SD 2.52) and widowed (mean 30.5, SD 5.10). After carrying out the post-hoc using tukey's HSD and LSD, it was found that the significant difference for patients' PCS and marital status was between single and married as well as between single and widowed.

There was a significant difference between employment status and their PCS (p=0.007). The highest PCS was in working patients (mean 38.3, SD 8.71), and retired (mean 34.1, SD 6.85). The lowest PCS was in not working (mean 33.2, SD 7.84). Post-hoc for employment showed that working patient is having higher PCS than not working. Education level did not show a significant difference with patients' PCS and MCS. Moreover, MCS did not show any significant difference with marital status and employment status.

After carried out ANOVA tests for education level, marital status and employment status for caregiver in relation to their QOL, there was no significant difference between these variables and QOL of caregiver (table 5).

Pearson correlation tests were carried out to check the relation between QOL of patient in relation to their caregiver. The result showed that there was no significant correlation between patients' and caregiver' MCS and PCS scores (table 6).

Discussion

As expected, patients and caregivers have poorer QOL compared with the general population as observed in Saudi and Lebanon, and with Iranian haemodialysis population (Coon et al., 1998; Sabbah et al., 2003; Pakpour et al., 2010). Furthermore the patients' QOL mean score was lower than caregivers' for all domains (Carmichael et al., 2000; Frank et al., 2003; Cleary & Dernnan, 2004; Al-Garni, 2006; Kalender et al., 2007; Sathvik et al., 2008) (Figure 1).

Sathvik et al. (2008) reported that ESRD is a chronic disease that has a high level of disability in different domains of patient lives leading to impaired QOL. Mittal et al. (2001) found that patients on haemodialysis treatment have poorer QOL than other chronic diseases such as chronic heart failure, diabetes mellitus, and chronic lung disease. In a comparative study by Sprangers et al. (2000) between different chronic conditions it was found that renal diseases and musculoskeletal diseases have greater physical and functional impairment. Patient is with renal diseases reported the poorest level of general health. Even in peritoneal dialysis, patients have lower QOL score compared to normative population and significantly lower than their caregiver (Shimoyama et al., 2003). Fan et al. (2008) found that PCS and MCS of peritoneal dialysis patients were lower than their caregivers but the difference was not significant.

Bapat et al. (2008) stated that common complication of dialysis such as: strict dietary restrictions, reduce social and recreational activities, medical complications, economic pressure, marital dispute, sexual dysfunction, emotional stress and anxiety, provide more pressure for patients and caregivers that further affect their QOLMoreover, different body systems are also affected by renal failure such as sleeping, eating, working, planning for daily schedule, and these can become a challenge for patients and families. So many permanent changes in family roles and expectation need to be done and this also increases the stress level as well as deteriorating QOL (Arslanian et al., 1992).

Besides that, many difficulties faced by the caregivers such as change in the sleep pattern, experience change in health, change in social activity, and change in holiday plans (Fast & Keating, 2001) In addition, patients and caregivers have to spend at least three days a week on dialysis which imposes limitations on social life and creates a feeling dependency on the dialysis centre. So, they have to make many modifications to their life style (Sezer et al., 2003).

Patients' PCS and MCS were almost similar, but caregivers' mental component score was worse than the physical. According to Merkus et al. (1999), previous studies concluded that over time PCS deteriorate faster than MCS. This is in line with a study by Park et al. (2010) that found higher MCS compared to PCS in European countries, USA, and Japan. Spiegel et al. (2008) also mentioned that Health Related QOL in ESRD showed highest impact on physical functioning and lowest on mental functioning, the impact of ESRD was least pronounced in mental health.

The caregivers' mental status was worse than physical. Belasco and Sesso (2002) found that caregivers' mental health and vitality were the most affected emotional dimension. Even in peritoneal dialysis, Fan et al. (2008) found that patients' PCS and MCS were lower than their caregiver but not significantly different between patients and their caregivers. Similar to haemodialysis, PCS of peritoneal patients was lower than MCS. However the caregivers' MCS was lower than PCS. Belasco and Sesso (2002) also found that patients had lower QOL than their caregivers, mainly in mental health. In contrast with Park et al. (2010) in Korea, patients' PCS is higher than MCS. According to Akash et al. (1999) 32% of haemodialysis patients in Jordan were disabled and need assistance with their daily activities.

A possible reason for the similarity between PCS and MCS score could be that PCS relatively improved compared to MCS because the culture in Jordan supports sick patients and family members, friends, and neighbours provide a supportive environment that will improve QOL. When a person gets sick, both society and traditional values expect the family members to take care for that person's emotional and financial support.

Moreover, most of patients were Muslim and according to Abdel-khalek (2010), Islam practises prayers that can reduce anxiety and depression. Religiosity is considered a remarkable factor that influences QOL and subjective well being. Furthermore, religiosity increases satisfaction in life; people who are religious have more social support and better habits (Berman et al., 2004). So, these will improve the physical and social life of patients and their caregivers.

Age was negatively correlated with PCS and MCS but the significant difference only detected on PCS. Thus as the patients become older, their PCS will decline. This finding was in line with several studies that also showed negative correlation between patients' age and their PCS (Mittal et al., 2001; Frank et al., 2003; Sabbah et al., 2003; Barotfi, 2005; Al-Garni, 2006; Bohlke et al., 2008).

There are many explanations for this; first, the sample here was relatively old, and as expected older age is better able to adapt emotionally with their chronic disease. Second, age was related to the physical dimensions of QOL, so it reflects the deterioration in physical by age. Third, the negative effect of disease process on physical activity of patient such as drop in Hematocrit, musculoskeletal, and neurological system problems. Finally, the patients usually have the ability to adapt psychologically to their situation over time but not physically. Moreover, Mittal et al (2001) stated that patients self-assessment of mental function is decrease with age.

Usually patients complain of lack of energy, feeling of disappointment and fatigue. The change in their health condition was due to the disease process and its treatment. With the process of aging there is a continuous and progressive reduction in one's capacity to maintain the body's homeostatic balance. Due to physiological decline because of aging, the elderly experience a gradual and progressive reduction in their function capacity. This may limit their activity daily living and consequently present worse QOL for dimensions associated with physical health (Kusumoto et al., 2008).

We found out that single patients' PCS was better than married, and married was better than widowed. These significant findings were in agreement with the Sabbah et al. (2003) study that revealed unmarried patients have better QOL than married. In disagreement with Sathvik et al. (2008) that, no association between marital status and QOL dimensions.

The interpretation for the better QOL in single patient was; according to this study, single patient was younger than married and widowed the mean age of single was 29 years old whereas married was 50 years and widowed was 59 years. Moreover, the education level for single was better than married and widowed; 75% of single have grade 9 and above, meanwhile in married was 41% and 18% in widowed. In addition about half of single patient was working and this improves their QOL, because working patient usually has better QOL compare with non working.

There was a significant difference in PCS between working and not working, where PSC of working patients is better than those not working and retired. However there was no significant difference in MCS between these groups. Other studies also supported this finding where they found out that employed patients have better QOL than unemployed (Frank et al., 2003; Sathvike et al., 2008). Kalender et al. (2007) mentioned that demographic factors such as unemployment, low education and low socioeconomic status can impair QOL. The justification for this was; financial independence may improve QOL in working patient to some extent. Moreover, the daily activity and work capacity may help in improve QOL scores (Sathvike et al., 2008).

Holding down a job certainly has a positive influence on the perception that an individual has of his or her role in society and it contributes towards improve self-esteem, which is considered to be an important aspect of QOL (Bohlke et al., 2008).

In addition, the working patient was younger than not working and retirement, 41, 46 and 55 years respectively. The working patient experience longer duration on dialysis than not working or retirement (the mode and median was 6 year), and this help the patient to cope well by time with his condition than new patients. Moreover 40% of the working was single patient which have better QOL compare with married or widowed.

There was no significant difference between duration of dialysis and QOL. Unruh et al. (2008) who followed-up patients for three years found there was no decline in MCS or PCS. However other studies (Mittal et al., 2001; Assal et al., 2006; Pakpour et al.,2010) found that there was a negative correlation between QOL and duration on dialysis. The explanations for non significant was male and female duration on dialysis was the same 7 years. In addition the duration for working and non working was the same also.

This study found that there was no significant difference between gender and QOL. A study in Egypt supported the same finding (Assal et al, 2006). According to this study the percent of highly educated patient was similar for male and female (each gender 15%). _Moreover the percent of single patient in both sexes was the same (23%). In addition, both male and female have the same years of duration on dialysis (7 years) and similar age, male mean age was 44 years old and female was 46 years old.

This study found no relation between education level and QOL. Other studies by Sabbah et al. (2003) and Pakpour et al. (2010) found that, increased education will also raise the QOL. Mingardi et al. (1999), Frank et al. (2003) and Assal et al. (2006) mentioned that PCS is related to education. A higher school education has essential role in raising the awareness of chronic disease and better coping ability with the chronic disease (Sathvik et al., 2008).

The reason for the non significant of education level with QOL was that the highly educated patient represent small portion (15% of total patient). Moreover, from the working patient only 9% of them was highly educated, which mean that even educated patient may loss their financial support which obstacle their payment to improve health.

Caregivers' age was negatively correlated with PCS and MCS. As the caregivers' age increases, their QOL declines. Preedy and Watson (2010) stated that caregivers demonstrated much more psychological disorders than physical illnesses, although they make more visit to the doctor, report poor health, and make greater use of medications compared to the general population. Moreover, Yagoda (2004) found that employed caregivers reported more stress than non dependent carers. Ho et al. (2005) also found that 35% of caregivers reported fair or poor health quality of life status.

Other demographic data such as gender, education level, marital status, employment status were not correlated with QOL of caregivers,

Patients' QOL score was lower than caregivers', but the difference was not statistically significant. This result was in line with the Fan et al. (2008) study that found the PCS and MCS of peritoneal dialysis patients were lower than their caregivers with no statistical difference. In addition, Unruh et al. (2004) found no significant difference between patient and general population in QOL scores.

The explanation may be related to the fact that 57% of caregivers were married and 55% of them were either daughter or son, so they have their own life which may not be affected by the patients' QOL. In addition, not all patient was physical or financial dependant because 66% of have no caregiver and their mean age was 45 years old. Moreover, 32% of them whether working or retired, so not all patient need financial support from others.

Usually the patient need more support and help during the initial time of start dialysis because it is a new situation need to be cope with. However, our sample has 6 years duration on dialysis, which means they already pass the stressful time. On the other hand, the carer' mean ages was 39 years old, 37% of them working or retired, so they almost not dependant physically or financial.

Conclusion

Present results showed a negative impact of ESRD and haemodialysis treatment on patients' and caregivers' QOL. The main findings of the study were; patients' and caregivers' QOL were lower than general population. Age was related to a decrease in QOL for patients and caregivers. Single patients' QOL was better than married and widowed. Working patient was better than not working and retired. Finally, no significant differences between patients' and caregivers' QOL.

In order to improve the QOL of both ESRD patients on haemodialysis and their caregivers, the government and Non-Governmental Organizations need to support these groups of people in terms of communication such as developing special support groups that consists of patients, caregivers as well as health staff. They can share their knowledge, experiences, ways to handle crisis, improve treatment compliance, and many more.

Further investigation is needed to examine QOL of patients and caregivers as well as the factors that may affect the QOL such as depression, pain, biomarker (anaemia, dialysis adequacy, body mass index, and albumin). Besides that, this study should also be extended to the private sector. This will eventually gives thorough results of the impact of ESRD on QOL.

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Tables and Figures

Table 1 The mean, and standard deviation of QOL scores for patient and caregiver

	Patient' mean (SD)	Caregiver' mean (SD)
PCS	34.55 (8.23)	44.04 (8.02)
Bodily pain	49.51 (32.10)	59.06 (28.18)
General health	45.37 (14.89)	55.80 (12.66)
Physical function	40.58 (25.25)	73.52 (20.17)
Role physical	7.79 (25.05)	30.08 (44.14)
MCS	34.79 (10.33)	37.00 (8.24)
Mental health	47.68 (21.11)	53.13 (16.57)
Social function	44.75 (31.60)	61.33 (25.85)
Vitality	38.41 (17.24)	49.30 (14.14)
Role emotion	12.56 (32.52)	28.65 (43.59)

Table 2 Pearson and Spearman correlations among patients' and caregivers' in relation with MCS and PCS

	MCS		PCS	
	Correlation	*P* value	Correlation	*P* value
Patient age (year)	$r = -0.096$	0.26	$r = -0.379$	0.001 *
Duration on dialysis (year)	$r_s = +0.067$	0.43	$r_s = +0.031$	0.72
Caregiver age (year)	$r = -0.293$	0.04*	$r = -0.373$	0.008 *

r_s = spearman rho coefficient *r: Pearson Correlation Coefficient* ** Significant $P < 0.05$*

Table 3 The relation between male and female QOL for patient and caregiver

	Male		Female		T value	P value
	Mean	SD	Mean	SD		
Patient						
PCS	35.8	8.53	33.3	7.83	1.81	0.073
MCS	34.6	11.29	35.0	9.38	-0.230	0.819
Caregiver						
PCS	45.6	8.7	41.3	6.7	1.90	0.062
MCS	38.0	9.08	36.1	4.95	0.91	0.37

Independent T- Test

Table 4 The relation between education level, marital status, employment status and the QOL for patient

		PCS			MCS		
	n	Mean (SD)	*F* stat.	*P* value	Mean (SD)	*F* stat.	*P* value
Education level							
Illiterate	21	31.7 (7.99)	1.28	0.28	31.1 (7.30)	1.35	0.25
Grade 1-8	52	34.7 (7.75)			34.2 (9.97)		
Grade 9-12	44	34.3 (8.41)			35.7 (10.80)		
collage	8	36.8 (8.12)			38.9 (11.73)		
Bachelor	13	37.8 (9.77)			37.6 (12.82)		
Marital status							
Single	32	39.0 (8.30)	5.12	0.002 *	37.5 (12.72)	1.23	0.30
Married	92	33.6 (8.00)			33.8 (9.82)		
Divorce	3	30.3 (2.52)			31.0 (10)		
Widowed	11	30.5 (5.10)			36.3 (5.18)		
Employment status							
Not working	94	33.2 (7.84)	5.19	0.007 *	33.7 (9.73)	2.91	0.06
working	35	38.3 (8.71)			36.0 (11.05)		
retirement	9	34.1 (6.85)			41.8 (11.73)		

ANOVA Test * *significant*

Table 5 The relation between education level, marital status, employment status and the QOL for caregiver

		PCS			MCS		
	n	Mean (SD)	*F* stat.	*P* value	Mean (SD)	*F* stat.	*P* value
Education Level							
Grade 1-8	17	39.9 (6.43)	2.563	0.067	36.1 (5.43)	2.46	0.075
Grade 9-12	20	44.1 (7.93)			35.4 (7.48)		
collage	3	43.7 (3.21)			36.0 (2.65)		
Bachelor	9	48.4 (9.70)			42.7 (8.82)		
Marital status							
Single	17	43.7 (8.69)	0.11	0.95	38.8 (6.55)	1.33	0.28
Married	27	43.6 (8.08)			36.5 (7.80)		
Divorce	2	41.5 (7.78)			28.5 (6.36)		
Widowed	3	41.3 (6.81)			37.7 (2.52)		
Employment status							
Not Working	31	41.8 (7.68)	2.82	0.07	36.6 (6.28)	0.70	0.50
Working	12	48.0 (6.16)			39.1 (9.32)		
retirement	6	42.3 (10.54)			35.3 (7.94)		

ANOVA Test

Table 6 The correlation between patient' QOL and caregiver' QOL

	PATIENT			
	MCS2		PCS2	
CAREGIVER	Correlation	*P* value	Correlation	*P* value
MCS1	*r* = 0.218	0.13		
PCS1			*r* = -0.146	0.32

r: Pearson Correlation Coefficient

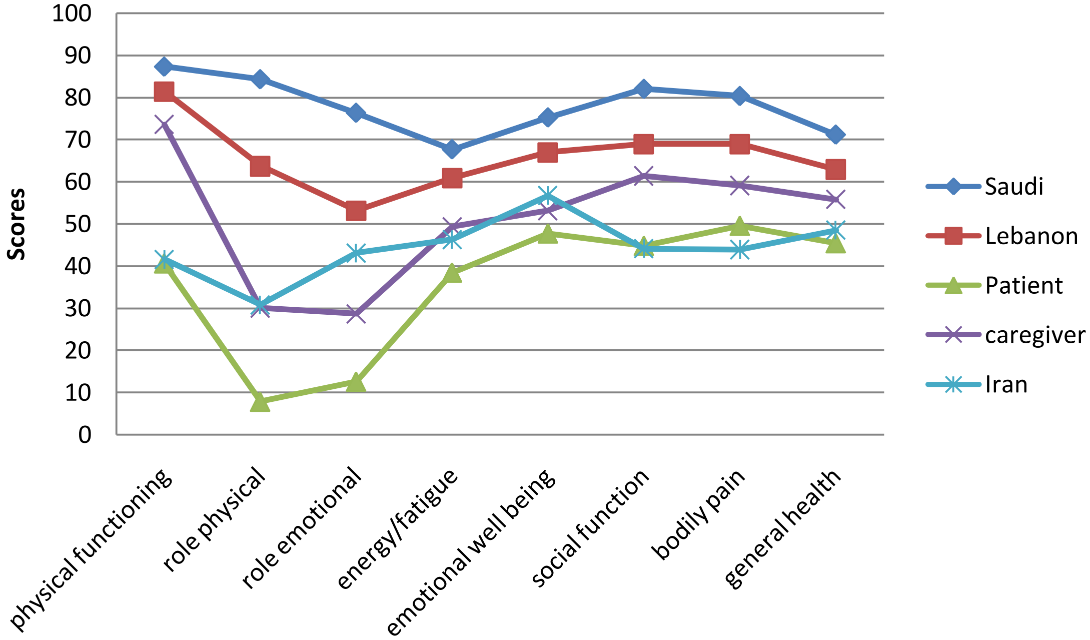

Figure 1 comparison of the RAND 36-items scores between haemodialysis patients, caregivers and other population