International Journal of Research Studies in Psychology
January 2013, Volume 2 Number 1, 79-95

Psychosocial versus clinical factors influencing QoL among renal transplant recipients

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ISSN: 2243-7681
Online ISSN: 2243-769X

OPEN ACCESS

Received: 25 July 2012 **Revised**: 2 August 2012 **Accepted**: 3 August 2012
Available Online: 5 August 2012 **DOI**: 10.5861/ijrsp.2012.159

Abstract

A longitudinal study was carried out to investigate the contribution of psychosocial and clinical factors in influencing satisfaction with Quality of Life (QoL) after renal transplantation. Renal transplant recipients were assessed at three times over a period of 15 months in Lahore (Pakistan). Our study aimed to analyze if QoL and perceptions of it are likely to be influenced by both psychosocial factors and the recipient's physical well-being related to the degree to which the transplant has been effective. The psychosocial variables included depression levels, perceived health status, life orientation (optimism) and conscientiousness. Clinical data comprised of their renal functioning, blood sugar, cholesterol, and blood pressure as health indicators. Recipients need to comply with immunosuppressant medicines on life-long basis for graft survival. Compliance was assessed by recording their blood immunosuppressant levels. The results indicated that across all three waves, psychosocial factors consistently appeared to be stronger predictors of QoL satisfaction than the clinical factors. Renal functions were found to be the only significant clinical predictors of QoL.

Keywords: quality of life; post operation; clinical predictors; psychosocial predictors; longitudinal study

Psychosocial versus clinical factors influencing QoL among renal transplant recipients

1. Introduction

Renal transplantation is a highly successful treatment modality, but it is not a cure. Although recipients do not return to pre-kidney failure health status but their QoL is changed in many ways (Fallon, Gould, & Wainwright, 1997). It is a physical experience that can affect the recipients' health status and psychological well-being. QoL and psychological responses to transplantation are constructs used as a framework for assessing different psycho-social responses after organ transplantation. These two concepts of QoL and psychological responses are closely associated i.e. problems in psychological processing after transplantation may influence QoL and vice versa (Goetzmanna, Saraca, Ambühlb, et al., 2008).

The main aim of renal transplantation is improved QoL, based on the WHO definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1948). It is suggested that a state of complete physical fitness is associated with psychosocial well being, highlighting the need to investigate not merely physical functioning and health status but also the environmental and personal aspects of an individual's life. This makes mental health support an integral part of post-transplant care because emotional disturbance can be a serious complication despite successful renal transplantation, particularly in younger recipients (Akinlolu, Hanson, Wolfe, et al., 2000).

Transplantation brings about numerous changes in the physical and psychological well-being of the recipient. The recipient is affected as a totality by the kidney transplant, as well as the recipient's primary social groups of family, peers and work place colleagues. There are changes in their body, mind and behavior. It is important to understand the factors contributing to subjective well-being. There are two types of consequence of the transplant experience, i.e. physiological/health indicators reflecting physical health status and the psychological well-being comprising of altered cognitions, affective condition and behavior reflected by individual coping styles. The psychological response to transplantation reflects the subtle and complex cognitive, emotional and behavioral process after transplantation (Goetzmanna et al., 2008). There may be a combination of positive and negative impact of transplantation depending on a variety of mediating factors which can be psychosocial and clinical in nature. It was found that overall QoL improves after kidney transplant, but the predictions of pre-transplant patients overestimated the magnitude of the improvement. Patients substantially overestimated the benefits of a successful kidney transplant, both in terms of predictions of life after treatment, and in their memories of QoL before the transplant (Smith, Loewenstein, Jepson, et al., 2008).

A successful transplant dramatically improves the physical? QoL but the psychological acceptance of the transplanted organ both by the recipients and his/her body is crucial to the success of transplantation. Renal transplant recipients (RTRs) with greater acceptance without any preoccupations relating to donor associated guilt have the best chance of physical and psychological recovery (Goetzmanna et al., 2008). The present study was carried out to assess QoL among RTRs in Pakistan and analyze the relative contribution of clinical vs. socio-demographic factors in influencing perceptions of QoL. Although transplantation is a physiological experience but it affects the individual as a whole. The study focuses on identification of the psychological issues post transplant that is considered to be equally important as medical / physiological indicators in modifying overall QoL.

1.1 Research Question

- Do transplant-related clinical factors are stronger predictors of QoL satisfaction than psychosocial factors?

2. Methodology

2.1 Study design

A longitudinal study was carried out in Lahore (Pakistan) comprising of RTRs, with ages ranging from 18-54 years, from diverse geographical regions of Pakistan recruited from the renal clinics in Lahore. These patients had a post-transplant period ranging from 6 months to 5 years and with normal graft functioning.

2.2 Participants and Recruitment

- **Inclusion criteria**: Renal transplant recipients currently on a schedule of regular follow-up appointments; age range of 18-54 years without any co-morbidity (existing physical or mental disorders); not more than one previous transplant, minimum basic formal schooling to equivalent of primary school level, and healthy graft functioning as indicated by follow up monitoring of renal function tests.

- **Exclusion criteria:** Renal transplant recipients with medical co-morbidities or complications and/or psychological disorders; outside the age range 18-54, recipients with no formal schooling; more than two kidney transplants in total, or any other co-existing transplant e.g., liver, heart or lung transplant along with a kidney transplant.

- **Measures :** Demographic information collected included age, gender, marital status, years of formal education, employment status, household income and number of dependents, familial background (rural/urban), and family system i.e. joint or nuclear. Medical information collected included basic clinical information about approximate onset and duration of end stage renal disease (ESRD), dialysis modality (hemodialysis, peritoneal or both) before transplant and duration of dialysis, primary & secondary nephrologic diagnosis to reveal the etiology of renal failure, time since transplant, current medication (immunosuppressant group and dosage), complete blood profile with renal functions (including, serum creatinine, blood urea, uric acid).

2.3 Quality of Life Index Kidney Transplant Version 111 (1998)

The QoL index developed by Ferrens and Powers (1998) consists of 35 items and measures both the satisfaction with, and importance of, the main domains of life. Importance ratings are used to weight the satisfaction responses so that the scores reflect the respondents' satisfaction with the aspects of life they value. Scores are calculated for QoL overall and in four domains: health and functioning, psychological/spiritual, social and economic, and family. Items that are rated as more important have a greater impact on scores than those of lesser importance. Satisfaction is rated from 1 = "very dissatisfied" to 6 = "very satisfied", and importance is rated from 1 = “very unimportant” to 6 = “very important”. Scores range from 0-30 and are calculated by weighting each satisfaction response with its paired importance response. Overall (total) scores and the four subscale scores, health and functioning, social & economic, psychological and spiritual, and family scores are calculated (Ferrans, 1990, 1996; Ferrans & Powers, 1992, 1996; Warnecke, Ferrans, & Johnson, 1996).

2.4 Beck Depression Inventory (BDI- II)

The Beck Depression Inventory (BDI, BDI-II), is a 21-question multiple-choice self-report inventory and is one of the most widely used instruments for measuring the severity of depression The scores can be related to role limitations due to emotional problems. Each item is responded to on a scale from 0 to 3, where 0 is for a statement describing minimum feeling regarding an aspect of depression and a score of 3 reflects severe depression. The responses on each dimension are summed and a total score is obtained. This total score is compared with the given cut off scores. The cutoffs used are: 0–13: minimal depression; 14–19: mild depression;

20–28: moderate depression; and 29–63: severe depression. Higher total scores indicate more severe depressive symptoms. Participants are asked to rate how they have been feeling for the past two week (Beck, Steer, & Brown, 1996).

2.5 Life Orientation Test-Revised (LOT-R)

The LOT-R assesses individual differences in dispositional optimism versus pessimism (Scheier, Carver, & Bridges, 1994). It is a 10-item measure with four filler items, three positively-worded items, and three reverse-coded items. Respondents indicate their degree of agreement with statements using a five-point response scale ranging from 0 = "strongly disagree" to 4 = “strongly agree". Negatively-worded items are reversed, and a single score is obtained.

2.6 Procedure

A longitudinal prospective cohort study was conducted over a period of 15 months with three times of assessment. RTRs were recruited from renal clinics in Lahore, Pakistan. The sample size varied at all three times of data collection because of drop outs and the inclusion of new participants. At time 1, the sample size was, N = (150), that reduced at time 2, N = (147) and at time 3, there were 3 more drop outs N = (144), reflecting the changes in the number of participants at each assessment.

The mean age of recipients was 34.14 years (ranging from 18 to 54 years). These patients had a post-transplant period ranging from 6 months to 5 years. We report data from three points, time 1, 2 and 3 over a period of two years. The assessments were conducted when they visited for their follow up sessions at the clinic individually, in the absence of family members. The measures included self-report questionnaires that were also translated into Urdu (their native language) for those that do not speak English. Demographic and medical information was obtained from their medical records, to follow side effects and their renal functioning to confirm a healthy graft and monitor complications or co-morbidities. The study received a favorable ethical opinion from University of Surrey Ethics Committee U.K.

3. Results

This three-time longitudinal study investigated clinical data and psychosocial variables to analyze their relative contribution as predictors of subjective QoL after renal transplant.

3.1 Sample Characteristics

The mean age of the study participants was 33.99 years (ranging from 18 to 54, SD=7.45), post transplant time ranged from 6 months to 5 years. For the purposes of the analyses, the recipients living with their spouses or engaged were considered to be in a relationship and those who were separated, widowed, divorced, or never married were considered ‘single’. The sample comprised mostly of recipients currently taking three medications, i.e. two immunosuppressant drugs (compulsory for transplant recipients), a conventional drug (cyclosporine) and a newer drug (mycofenolate) along with steroids. Most recipients were highly educated, with a high rate of professional qualification (N = 66) and were mostly in employment (N= 92). There was a lower representation of recipients with a low socioeconomic status (SES; N= 8), and most recipients belonged to an average SES (N= 78) determined on the basis of monthly family income. For the purpose of analysis, the longitudinal data were used to examine the contribution of psychosocial and clinical and factors to predicting subjective QoL (Table 1).

3.2 Quality of Life after Renal Transplant

QoL is conceptualized as a multidimensional phenomenon reflecting an individual’s perceptions of physical health status, psychological well-being (happiness and life satisfaction) of individuals as influenced by their demographic, biological, and psychological characteristics, as well as the social, economic, personal, and

situational variables (Cetingok, Winsett, & Hathaway, 2004). Therefore, QoL in the present study, was measured as a subjective construct, as individual's perception of his/ her life post transplant by using QoL Index which had scores ranging from 0-35 on four subscales (health functioning, family life, social & economic conditions and psychological & spiritual well-being), with higher scores reflecting increased satisfaction with their QoL.

Table 1

Demographic characteristics of renal transplant recipients

Items	Time 1		Time 2		Time 3	
	n	%	n	%	n	%
Gender						
Male	99	67.3%	97	66.7%	94	67.4%
Female	48	32.7%	49	32.7%	47	33.3%
Marital status						
In a Relationship	69	47.9%	75	47.9%	75	51.0%
Single	75	52.1%	71	52.1%	72	49.0%
Education level						
School level only	35	24.3%	35	24.3%	35	23.8%
Graduate	43	29.9%	43	29.9%	43	29.3%
Post graduate	66	45.8%	68	45.8%	69	46.9%
Work status						
Employed	92	64.3%	94	64.3%	95	64.6%
Unemployed	51	35.7%	52	35.7%	52	35.4%
Home location						
Rural	84	58.7%	86	58.7%	87	59.2%
Urban	59	41.3%	60	41.3%	60	40.8%
Family system						
Joint	37	25.2%	35	23.8%	110	74.0%
Nuclear	100	74.8%	108	73.5%	37	25.2%
Monthly income						
< Rs*.25k	8	5.6%	8	5.6%	8	5.4%
Rs.26-50k	78	54.2%	78	54.2%	78	53.1%
Above Rs.50k	58	40.3%	60	40.3%	61	41.5%

The results across all three times over a period of 15 months indicated that most recipients were satisfied with their QoL after renal transplant and with the passage of time; there was a slight increase in the satisfaction reports as indicated by their mean scores on QoL Index at time 2 and 3. The mean score for the overall QoL at time 1 was 23.71 (SD = 3.45) (Table 2).

Table 2

Total Scores on the QoL Index at Time 1, 2, & 3

QoL Scores	N	Minimum	Maximum	Mean	*SD*
QoL Time 1	150	12.08	35.00	23.71	3.45
QoL Time 2	147	16.41	29.35	23.74	2.62
QoL Time 3	144	17.50	29.31	24.98	2.35

The findings suggest that minor variations do occur in subjective QoL at different points of time, and most RTRs appeared to be satisfied by their life post transplant. The scores on QoL index subscales over a period of 15 months showed that RTRs reported highest satisfaction with their family life, followed by their health functioning, social and economic conditions and lastly psychological and spiritual well-being. The study further compared the clinical and psychosocial factors as predictors of QoL to analyze the extent of their influence on perceived QoL (Table 3).

Table 3

Descriptives of QoL index subscales

QoL Subscales	N	Minimum	Maximum	Mean	*SD*
*HF Time 1	146	12.09	31.97	23.98	3.23
HF Time 2	145	15.88	29.47	23.80	2.85
HF Time 3	144	17.37	29.69	24.80	2.59
*FS Time 1	146	17.10	30.50	27.03	3.31
FS Time 2	147	16.50	30.00	25.96	3.35
FS Time 3	144	18.00	31.67	27.08	3.14
*SE Time 1	146	9.93	28.21	21.09	3.55
SE Time 2	147	12.21	28.93	22.01	3.21
SE Time 3	144	15.07	28.21	23.71	2.63
*PS Time 1	146	13.94	18.00	16.52	.774
PS Time 2	147	13.90	18.00	16.76	.710
PS Time 3	144	15.26	18.00	17.04	.608

Note. *HF (Health Functioning), *FS (Family subscale), *SE (Social & Economic), *PS (Psychological & Spiritual)

3.3 Clinical Variables and QoL

The study included clinical information about the pre and post-transplant characteristics and medical factors considered to be associated with the efficacy of renal transplantation. The purpose was to see whether differences in clinical variables influence level of QoL satisfaction. The medication administered included two immunosuppressant drugs, a conventional drug (cyclosporine) and a newer drug (Mefotonil) along with steroids which are known to cause adverse side effects. By the time of the 3rd assessment, many recipients had either stopped or had reduced their steroid dose, which is mostly prescribed in the first year after transplant. Moreover, some recipients had developed high blood pressure that is a known side effect of the immune-suppressants. Therefore, these recipients were prescribed anti-hypertension medicines. The clinical data are presented in Table 4. The clinical data included information about recipients' renal function and associated factors that affect health status. The results indicate that most of the RTRs had healthy functioning of the transplanted kidney as indicated by creatinine levels and blood urea. Moreover, improved graft functioning is also confirmed by recipients' hemoglobin levels as the kidney is responsible for making hemoglobin. Normal blood sugar and cholesterol levels are indicative of minimal side effects of anti-rejection medications that often cause increased cholesterol in RTRs (Table 5).

Table 4

Clinical/ Medical Characteristics of the Recipients

Variables	n	%	Variables	n	%
Medication group			**Type of transplant**		
Cyclosporine & Mefotonil	33	22.4	Living un-related donor	76	52.1
Cyclosporine only	18	12.2	Living related donor	70	47.9
Cyclosporine, Mefotonil & Steroid	96	65.3	**Post transplant time**		
Causes of renal failure			6-11 months	23	15.8
Blood Pressure	86	58.5	1-4 years	110	73.3
Nephrotoxicity	35	23.8	5 years and above		
Unknown	21	14.3	**Duration of dialysis**		
Duration of ESRD			No dialysis	18	12.2
1-4 years	105	71.4	< 6 months	110	73.3
5 years and above	42	28.6	> 6 months	19	12.9
Donor gender					
Male	84	57.5			
Female	62	42.5			

Note. Nephrotoxity (drug-induced renal failure), ESRD (End Stage Renal Disease)

Table 5

Medical Indicators associated with Renal Transplantation

Variables	Time 1		Time 2		Time 3		Normal range
	M	*SD*	*M*	*SD*	*M*	*SD*	
Creatinine levels	1.1	0.26	1.04	0.183	1.17	0.158	0.5- 1.4 mg/dL
Blood urea	34.9	6.11	32.63	5.95	35.75	3.91	15- 45 mg/dL
Hemoglobin	12.9	1.66	13.83	1.09	13.73	1.01	M=14-16; F=12-15
Blood sugar random	140.3	60.77	127.5	28.3	124.5	24.4	70-180 mg/dL
Uric acid	5.1	1.23	4.78	0.954	4.3	0.782	M=3.4-7 mg/dL F= 2.4-5.7 mg/dL
Cholesterol	169.0	26.28	164.3	23.3	162.7	24.3	100-200 mg/dL

The above table shows that most RTRs had their renal functions, hemoglobin, blood sugar, and cholesterol levels within normal ranges reflective of their normal health status and good functioning of the transplanted kidney. The clinical variables were categorized into three groups to assess their specific influence on QoL across three times. The three groups were:

- Transplant-related Characteristics
- Renal Functions
- Health Indicators (See Figure 1)

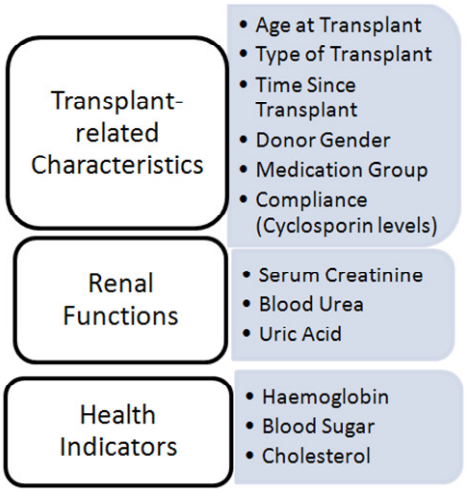

Figure 1. Three groups

3.4 Transplant-related Characteristics & QoL

Regression analysis of transplant-related clinical variables at time1 indicated that the recipients' age at transplant and gender are the only predictors of overall QoL indicated by scores on QoL index at time 1. Other transplant related variables did not appear to be significant predictors of their QoL post-transplant.

Table 6

Transplant-related characteristics Predicting QoL at Time 1, 2, and 3

Clinical predictors	Time 1			Time 2			Time 3		
	β	*t*	Sig.	*β*	*t*	Sig.	*β*	*t*	Sig.
Age at transplant	-.201	-2.39	.018	-.170	-1.81	.072	-.212	-2.40	.017
Gender	-.247	-3.00	.003	-.125	-1.46	.146	-.296	-3.72	.000
Type of renal transplant	.014	.157	.875	.077	.842	.401	.107	1.27	.206
Time since transplant	.049	.516	.607	-.012	-.132	.895	-.066	.753	.453
Donor gender	-.039	-.427	.670	-.059	-.643	.521	-.046	.555	.580
Medication group	.031	.328	.743	-.047	-.564	.574	.110	-1.38	.167

Note. Dependent variable: QoL time 1, 2, & 3

Our findings suggest a negative relationship between age at transplant and QoL reflecting that QoL decreases with increasing age. Although age is considered as an important criterion for transplant candidacy but its impact on nature of life post transplant is still not determined.

Table 7

Age at Transplant & QoL Time 1, 2, and 3

QoL Scores	Age at transplant
Time 1	-.171*
Time 2	-.189*
Time 3	-.241**

The significant negative correlations indicate that QoL satisfaction decreases with age, supporting the medical claim that young recipients tend to enjoy better health status after transplant due to absence of co-morbidities, ultimately influencing their overall QoL. Gender differences in QoL are also found in our study at time 1 and 3 suggesting that male recipients report better QoL than females (Table 8).

Table 8

Gender differences in QoL among RTRs

QoL	Gender	Means	*SD*	*t*	*df*	Sig.	*d*	*r*
Time 1	Males	23.97	2.79	2.805	145	.006	0.47	0.23
	Females	22.48	3.41					
Time 2	Males	23.98	2.59	1.450	142	.149	0.25	0.12
	Females	23.30	2.69					
Time 3	Males	25.38	2.20	3.008	139	.003	0.52	0.25
	Females	24.15	2.47					

Our findings are also supported by previous research confirming that female recipients report a lower QoL as compared to males (Johnson, Wicks, Milstead, Hartwig, & Hathaway, 1998).

3.5 Renal Functions as Predictors of QoL

Renal functions are the most important indicators of health functioning after a renal transplant. The level of Serum Creatinine in the blood mainly indicates how well the kidney is functioning. Associations between QoL and recipients creatinine levels were analyzed.

Table 9

Correlations among QoL and Renal Functions (Creatinine levels)

Renal Functions	QoL Time 1	QoL Time 2	QoL Time 3
Creatinine Time 1	.075	.015	.015
Creatinine Time 2		-.038	-.105
Creatinine Time 3			-.168*

Note. *p < .005

The above table shows that creatinine levels indicative of renal functions are not associated with recipients subjective QoL at time 1and 2 but there is a significant negative correlation only at time 3, suggesting that higher levels of serum creatinine may reduce/lower QoL satisfaction though the effect is small. Causal relationships among QoL and renal functions were also explored. The recipients' creatinine, blood urea and uric acid levels were analysed across 3 times to see if QoL is predicted by renal function (See Table 10).

Regression analysis of time 1 and 2 indicated that no renal function is a significant predictor of QoL satisfaction among RTRs. Interestingly, at time 3, serum creatinine appeared to be the only predictor of QoL satisfaction but there was no consistent pattern across three times, suggesting that subjective QoL is not substantially influenced by physical health status of the recipients at least in this sample.

Table 10

Renal Functions as Predictors of QoL Time 1, 2 and 3

Renal functions	Time 1			Time 2			Time 3		
	β	*t*	Sig.	*β*	*t*	Sig.	*β*	*t*	Sig.
Serum Creatinine	.140	1.10	.271	-.096	-.849	.397	-.330	-2.50	.014
Blood Urea	-.162	-.140	.183	-.80	.748	.456	.211	1.57	.117
Uric Acid	.096	1.01	.311	.017	.167	.868	.000	.003	.998

Note. Dependent variable: QoL time 1, 2, and& 3

3.6 Health Indicators as Predictors of QoL

Other health indicators included for analysis in the study were haemoglobin, cholesterol and blood sugar levels. The regression analysis of time 1 and 2 indicated that none of these health indicators were significant predictors of recipients' QoL satisfaction [F (3, 141) = 1.15, p = .329 and F (3, 142) = 1.49, p = .218 respectively]. However, at time 3, haemoglobin (β = -.200, p = .023) and blood sugar levels (β = -.203, p = .021) were found to be predictors of QoL [F (3, 140) = 6.10, p = .001, Adjusted R^2 = .097]. Cholesterol levels did not predict QoL at any time in this longitudinal study.

In order to find if QoL is an outcome of clinical variables, a multiple regression analysis including all clinical variables was carried out to analyze which of these were consistently strong predictors of QoL. The results indicated that none of the medical factors and health indicators appeared to be a significant predictor of QoL over time (Table 11).

Table 11

Clinical (transplant-related) factors as predictors of QoL

Clinical Factors	Time 1			Time 2			Time 3		
	β	*t*	Sig.	*β*	*t*	Sig.	*β*	*t*	Sig.
Creatinine levels	.180	1.398	.164	-.066	-.738	.462	-.159	-1.135	.258
Blood urea	-.174	-1.487	.139	.060	.641	.523	.219	1.672	.097
Hemoglobin Level	.116	1.356	.177	-.035	-.272	.786	.241	2.687	.008
Blood Sugar Level	-.069	-.733	.465	.042	.370	.712	-.150	-1.777	.078
Uric acid	.161	1.454	.148	.140	1.443	.151	.023	.225	.822
Cholesterol level	-.065	-.587	.558	-.065	-.720	.473	-.079	-.812	.418

Note. Dependent variables: QoL time 1, 2, and 3

Clinical factors did not predict QoL satisfaction at time 1, F(6, 139) = 1.277, p= .272, R^2 = .052. Similarly at time 2, no significant predictor was found, F(8, 134) = .606, p= .772, R^2 = .035. At time 3, we found that only hemoglobin levels appeared to be the only significant predictors of QoL but without a consistent pattern over time, F(6, 137) = 3.186, p= .006, R^2 = .122, indicating that recipients' perception of QoL is not determined by their physical health status.

Correlates of demographic variables and transplant related clinical variables were analyzed to understand the extent and contribution of these variables in influencing subjective QoL. The importance of this is to ensure that when the more psychologically interesting correlates of QoL are studied these somewhat more fixed and immutable factors are not overlooked. Renal function (serum creatinine) that is assumed to be the most important indicator of health post transplant did not appear to influence perceived QoL to any great extent, suggesting that subjective QoL is not a direct reflection of physical condition. The reason can be attributed to the fact that physical well-being and health is not affected until creatinine levels become extremely high for a long period of time. Transitory fluctuations in serum creatinine do not cause any significant deterioration in the recipients' health. Therefore, it might be possible that in our study, high creatinine levels i.e. > 1.4 mg/dL, might not be high

enough to cause physical symptoms; therefore, it cannot be assumed that QoL satisfaction is not affected by physical well-being.

The impact of health indicators, such as blood pressure, blood sugar, and cholesterol level and body weight on recipients' satisfaction with QoL were also investigated. The results indicated that blood pressure appeared to be a significant correlate of QoL, recipients with normal blood pressure levels reported more satisfaction with QoL as compared to those with high blood pressure. No significant differences in QoL were found among RTRs with normal and high cholesterol and blood sugar levels. Only at time 3, recipients with normal blood sugar levels appeared to be more satisfied than those with high sugar levels, so it cannot be assumed that cholesterol and blood sugar levels influence subjective QoL in any simple direct way.

Although clinical variables are considered crucial to the success of transplant and graft longevity as the main indicators of recipients' physical health status, but our findings suggest that clinical factors do not directly influence recipients' perception and satisfaction with their QoL. Therefore, keeping in view, the aim to find what factors influence perceived QoL and varied levels of satisfaction with similar physical health status among RTRs, the psychosocial variables were analyzed next.

3.7 Psychosocial Factors and QoL

The longitudinal study involved measurement of psychosocial aspects of the recipients including their QoL, PHS (Perceived Health Status), Life Orientation (Optimism), Depression, and Consciousness. The aim was to analyze differences in psychological orientation and well-being of the RTRs resulting in varied QoL. The psychosocial assessment comprised of measuring the following components;

- Quality of Life: Since QoL is a broad multi-dimensional concept, therefore, for the purpose of analysis, we have included subjective QoL, since it involves individual's perception of satisfaction with his/her health status, family life, social & economic conditions, psychological & spiritual well-being.
- PHS: Individual's evaluation and perception of his/ her physical well-being and health functioning.
- Life Orientation: Individual's perceptions of self, others and life in general, particularly his/ her attitude and approach towards past, present and future.
- Depression: An affective state of the individual with the predominant mood being sad, low, and pessimistic about self, others and future.
- Conscientiousness refers to the extent to which a person is organized, careful, self-disciplined, and responsible.

This longitudinal study attempted to explain the role of psychosocial factors in modifying consequent QoL. The theoretical framework of Wilson and Cleary (1995) was used which is a causal pathway model linking clinical and psychological variables to QoL in order to connect objective measurement with subjective experience. This model classifies health outcome measures into five levels, including; biological and physiological factors, symptoms, functioning, general health perceptions, and overall QoL. The study explored the role of psychosocial predictors of QoL including' depression levels, perceived health status, life orientation and conscientiousness.

3.8 Model of QoL

The model of QoL presents a combination of clinical and psychosocial (non-medical) in modifying overall QoL as an outcome, among people with chronic life conditions. The present study investigated the extent of influence each group of variables i.e. medical and non-medical had on QoL after renal transplant. Significant associations were found among the psychosocial variables and their QoL over time.

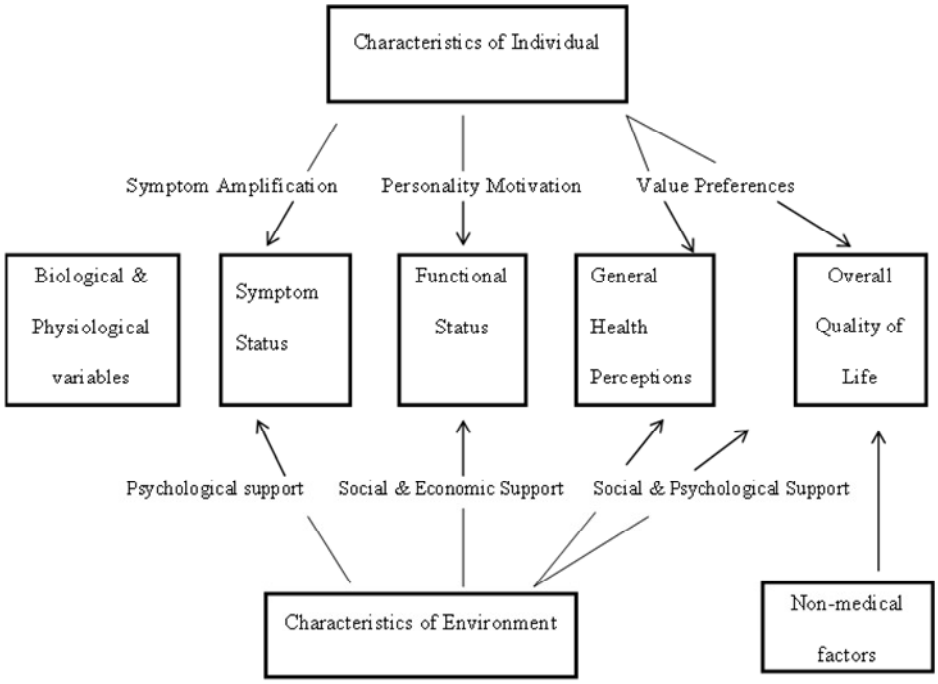

Figure 2. Wilson and Clearly (1995). Theoretical model of quality of life.

Notes: The horizontal arrows indicate the main, but not exclusive, direction of causality.

Table 12

Associations among Psychosocial Variables & QoL at time 1, 2, and 3

Psychosocial Variables	QoL 1	QoL 2	QoL 3
Depression 1	-.689**	-.372**	-.336**
Depression 2		-.532**	-.372**
Depression 3			-.538**
Perceived Health status 1	.423**	.187*	.141
Perceived Health status 2		.370**	.105
Perceived Health status 3			.331**
Life orientation 1	.621**	.196*	.185*
Life orientation 2		.457**	.304**
Life orientation 3			.309**
Conscientiousness 1	.043	.142*	.010
Conscientiousness 2		.234**	.227**
Conscientiousness 3			.168*

Note. **p< .001, *p< .005

The above table shows that QoL has a significant negative correlation with depression levels at all three times of assessment, indicating that depressed RTRs tend to be less satisfied with their QoL. The results in our study showed a pattern indicating a reduction in recipients' depression levels with time. The severity of depression seemed to decrease with increasing time since transplantation. Most recipients (94.5 %) at time 1 either reported minimal or mild level of depression with only a few (4.8%) reporting moderate and just one case of severe depression.

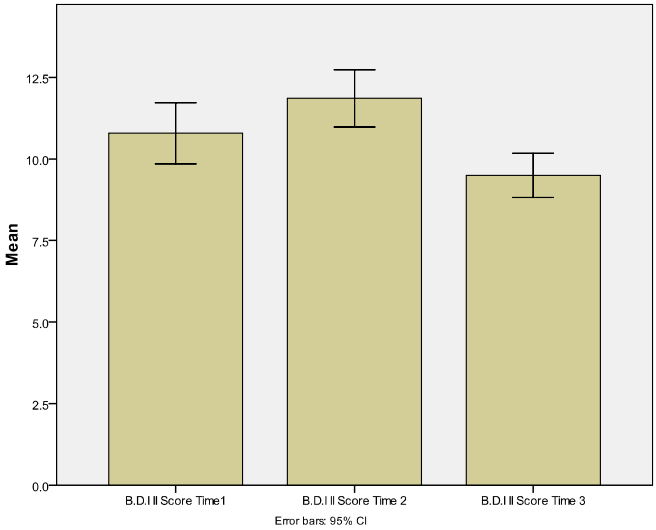

Figure 3. Graph showing occurrence of depression among RTRs at time 1, 2, and 3

The self-reports of depression improved in time 2 where most recipients reported minimal and mild depression and few reporting moderate depression but not a single case of severe depression. Interestingly, at time 3, all recipients (100%) either reported minimal or mild depression only. There are no cases reporting moderate or severe depression, indicating a positive change in recipients' affective condition with the passage of time.

QoL also appeared to be significantly associated with perceived health status (PHS) consistently over time, reflecting that recipients' with a better perception of their physical health status tend to be more satisfied with their QoL. Optimism and QoL also appeared to have a significant positive correlation at all three assessments, indicating that recipients with a positive life orientation tend to be more satisfied with their QoL. In contrast to these three psychosocial variables, the personality trait of conscientiousness did not appear to be associated with QoL at time 1, but at time 2 and 3, we found a significant positive association, suggesting that conscientious recipients reported a more satisfied QoL.

A multiple regression analysis was carried out to find which psychosocial factors are stronger predictors of QoL with a consistent pattern over time. The results showed that only depression appeared to be a consistently significant predictor of QoL at all three times of assessment.

Table 13

Psychosocial predictors of QoL at time 1, 2, and 3

Psychosocial Variables	Time 1			Time 2			Time 3		
	β	*t*	Sig.	*β*	*t*	Sig.	*β*	*t*	Sig.
Depression	-.640	-9.014	.000	-.358	-4.077	.000	-.446	-5.512	.000
PHS	.093	1.311	.192	.170	2.278	.024	.093	1.151	.252
LOT-R	.022	.347	.729	.161	1.799	.074	.133	1.734	.085
CS	-.029	-.465	.642	.073	1.007	.316	.058	.789	.432

Note. Dependent Variables: QoL time 1, 2, and 3

The above table shows an inconsistent pattern of psychosocial factors in predicting QoL over time. At time 1, depression (β = -.640 p= .000) was the single significant predictor of QoL. F(4, 138)= 31.385, R2= .476, p= .000. At time 2, depression (β=-.358, p= .000) and perceived health Status (PHS) (β = .170, p= .024) appeared to be significant predictors of QoL F(4, 141) = 18.637, R^2=.346, p= .000. Comparatively, depression appeared to be a stronger predictor of QoL than PHS. Again at time 3, depression (β = -.446, p= .000) was the only significant predictor of QoL among RTRs F(4, 139)= 16.475, R^2=.322, p= .000.Interestingly, the personality trait of

conscientiousness, and optimism as reflected by their life orientation did not appear to influence QoL at any time of assessment.

The present study found that out of the four psychosocial variables measured in this longitudinal study, only depression levels showed a consistent pattern of predicting QoL satisfaction among RTRs over 15 months. Whereas, perceived health status, life orientation (optimism) and the personality trait of conscientiousness did not predict recipients' subjective QoL.

4. Discussions

Renal transplantation is considered to be the best available choice of treatment for patients with kidney failure. Efforts have been made to improve the efficacy and longevity of transplantation. There is extensive research investigating the medical and clinical factors that affect health outcomes after kidney transplantation. The aim is to identify potential risk factors so that longevity and quality can be added to the recipients' life.

Pakistan is a developing country with relatively few resources and limited quality health care services available to general population but interestingly, it has the highest rates of kidney transplants in the world. The Sindh Institute of Urology and Transplantation (SIUT) is the largest centre in South Asia and it performs the highest number of kidney transplantations in the world (Rizvi et al., 2003). Despite this, most research on transplant outcomes is only limited to medical aspects of transplantation. There is consensus on the significance of socio-demographic and psychosocial factors in influencing life after transplant (Weng & Dai, 2005). So far, there is no study on psychological well being and QoL of recipients post renal transplant in Pakistan. Therefore, we aimed to compare the influence of psychosocial and clinical factors to highlight the significance of psychological issues which need to be addressed in order to improve subjective QoL after transplant. In most cases, health care costs are not fully covered by insurance or government support systems. Despite issues of affordability and availability of quality health care services, most recipients in the present study reported moderate to good levels of satisfaction with their QoL. The study found that QoL satisfaction was not primarily an outcome of physiological factors/ health status as indicated by the clinical data.

Most recipients reported a moderate level of satisfaction with their family life, psychological and spiritual well-being and social and economic conditions as indicated by their scores on QoL index subscales reflecting efficacy of renal transplantation in Pakistan. This is consistent with previous findings as it is generally accepted that QoL improves dramatically after successful renal transplantation as compared to patients maintained on dialysis (Fiebiger, Mitterbauer, & Oberbauer, 2004). Our study sought to see whether clinical factors are stronger predictors of subjective QoL i.e. recipients perceptions of their overall life than psychosocial ones. An extensive literature has investigated the predictors of improved QoL among RTRs (Rosenberger et al., 2005) and found that predictors are diverse in nature, (socio-demographic, psychological and medical) modifying recipients' satisfaction with QoL.

In the present study, we found that only two demographic factors, age and gender, which are also considered as transplant-related characteristics due to their role in modifying health outcomes, influenced QoL. Clinical/medical factors, including renal function (serum creatinine and blood urea) and health indicators including; blood sugar, cholesterol, uric acid and immunosuppressant levels did not appear to be significant predictors of QoL. Only at time 3, serum creatinine, which is considered as the main indicator of graft functioning, predicted QoL at time 3, but not at time 1 and 2, suggesting that it was not a consistent predictor of QoL over a period of time.

Differences in QoL outcomes for various age groups of RTRs are not extensively studied. Our study found that younger RTRs tend to be more satisfied with their QoL but in contrast to our findings, previous studies found that QoL outcomes do not appear to favor one age group over another, although psychosocial outcomes may warrant some additional consideration (Cetingok, Winsett, & Hathaway, 2004). It is suggested that age and co morbidity had a considerable influence on changes in QoL after transplantation (Jofré, López-Gómez, Moreno,

Sanz-Guajardo, & Valderrábano, 1998). Old age is found to be the most negative predictor of Perceived Health Status (Rosenberger et al. 2006) indirectly influencing subjective QoL. Most studies concluded that in general, the post-transplant QoL of all recipients, younger and older, was similar. (Cetingok et al., 2004). Whereas gender differences in QoL found in our study are consistent with previous studies as an improvement in QoL was much more marked in men than in women, for unclear reasons (Jofre et al., 1998). Another study found that women scored consistently lower than men on most QoL measures (Johnson, Wicks, Milstead, Hartwig, & Hathaway, 1998).The explanations for gender differences are not clarified in most studies.

Psychosocial variables, including life orientation (optimism), perceived health status and conscientiousness did not show a consistent pattern of being predictors of QoL at three times of assessment. Depression was found to be the only consistent psychosocial predictor of QoL. RTRs with lower levels of depression appeared to be more satisfied with their QoL after a renal transplant. The study explored reciprocal causal relationships between depression and QoL and found that QoL is an outcome of recipients' depression level rather than QoL predicting depression. This shows that depression among RTRs could be a result of other environmental and personal or socio-demographic factors rather overall QoL. It has been seen that depression reduces significantly as QoL improves dramatically after successful renal transplantation as compared to patients maintained on dialysis (Fiebiger, Mitterbauer, & Oberbauer 2004). Most RTRs in our study reported minimal to mild level of depression despite financial constraints, which is in conformity with previous research findings reflecting the efficacy of transplantation in a developing country. There are limited studies exploring the clinical and sociodemographic correlates of depression in RTRs (Szeifert, Molnar, Ambrus, et al., 2010).

In a recent large retrospective study, cumulative incidences of clinically diagnosed depression were 5%, 7%, and 9% at 1, 2, and 3 years after kidney transplant (Dobbels, Skeans, Snyder, et al., 2008). Significant gender differences in depression levels were also found in our study, indicating that female recipients reported more depression than male recipients. In contrast to our findings, another study, did not find an association between age or gender and depression (Akman, Ozdemir, Sezer, Micozkadioglu, & Haberal, 2004). But there is evidence that female gender, unemployment, low income, and living alone are risk factors for depression in both the general and chronic kidney disease (CKD) populations (Dobbels et al., 2008; Vamos, Mucsi, Keszei, Kopp, & Novak, 2009). Since, depression can be considered as a potential risk factor for negatively influencing life satisfaction, it is important to identify vulnerable groups of recipients who tend to be more depressed.

Perceived health status (PHS) was assessed to see if health perceptions are associated with the level of satisfaction with QoL. Rosenberger et al. (2005) investigated the predictors of better Perceived Health Status (PHS) comparing three age groups of RTRs and found that a better PHS in recipients less than 40 years old was predicted by social support, lower creatinine (kidney function) levels, and lower stress from adverse effects, where as in the 40-59 age group education levels, increased housekeeping activities and lower stress from adverse side effects predicted better PHS. Interestingly, when PHS was analyzed as an overall predictor of QoL, it did not appear to be a strong predictor consistently over the three testing periods in the present study.

Although we found significant positive associations among Life Orientation (optimism) and QoL but it did not predict QoL at any time of assessment. Conscientiousness is a personality trait that directly influences compliant behavior, crucial for graft survival and longevity and is associated with subjective variables such as medication compliance after transplantation (Raiz, Kilty, Henry, & Ferguson, 1999). Our findings did not support the claim as recipients with high scores on conscientiousness did not differ in satisfaction with QoL nor it appeared to be a strong predictor of QoL.

5. Conclusion

QoL among renal transplant recipients appears to be more of a subjective construct that is more strongly predicted by psychological factors than clinical factors. It is recommended that recipients should be screened and referred for management of depression for improving subjective well-being and overall QoL.

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