

Health related quality of life in patients with end stage renal disease undergoing maintenance haemodialysis

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ABSTRACT

Introduction: Assessment of Health-related quality of life (HRQOL) is an acceptable modality to determine the physical, social and emotional wellbeing of patients with Chronic Kidney Disease. **Objective:** The study was designed to assess the Quality of life of patients on Maintenance Haemodialysis and also identify characteristics that may be associated with their worsening quality of life. **Methods:** An observational cross-sectional study involving Adult ESRD Patients on Maintenance HD at four different units in South Western part of Nigeria. **Results:** The SF-36 scores for the 8 domains were Physical functioning - 50.0 ± 27.9 , Role functioning – physical - 36.6 ± 40.4 , Bodily pain - 60.3 ± 26.9 , General Health - 47.4 ± 22.8 , Vitality - 51.1 ± 19.7 , Social functioning - 39.0 ± 30.6 , Role functioning – Emotional - 52.9 ± 42.8 , Mental Health - 70.3 ± 18.2 . The frequency of HD per week was significantly correlated with Physical functioning ($r = 0.436; p=0.004$), Role – physical ($r = 0.435; p=0.004$), Bodily Pain ($r=0.358; p=0.022$), General Health ($r=0.361; p=0.021$), Social Functioning ($r=0.576; p<0.001$), Role – Emotional ($r=0.518; p<0.001$) and Mental Health ($r=0.313; p=0.046$). The total serum protein, serum albumin levels and packed cell volume correlated with more than one SF-36 quality of life domains. **Conclusion:** HRQOL is suboptimal in our end stage renal disease (ESRD) patient population. The packed cell volume and serum albumin levels were significantly correlated with the HRQOL.

Keywords: Health-related Quality of life, Chronic Kidney Disease, Maintenance Haemodialysis,

INTRODUCTION

Health-related quality of life (HRQOL) is the extent to which one's usual or expected physical, social, or emotional well-being (quality of life) is affected by a medical condition and/or its treatment.(1) Instruments to assess HRQOL may be subjective and objective; subjective assessments involve patient-reported outcomes, which are measuring aspects of a patient's health status directly from him, without the interpretation by a health care provider. It is the more acceptable form of HRQOL assessment. (1)

Assessing haemodialysis (HD) adequacy should apart from measuring the quantity (dose) of dialysis delivered, also determine if HD has achieved the fundamental principle of prolonging life, relieving distress and restoring function. Generic instruments used to assess HRQOL in ESRD patients on dialysis include SF-36 Health Survey Questionnaire, Karnofsky Performance Status Scale (KPSS) and the disease-specific instruments like Kidney Disease Quality of Life Questionnaire (KDQOL)(2–4) SF-36 measures quality of life in a multidimensional approach. Different perspectives of HRQOL are assessed in eight domains; physical functioning, role limitations due to physical health problems, bodily pains, general health, vitality (energy/fatigue), social functioning, role limitations due to emotional problems and mental health.

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Its rating depends on the patients' assessment of their health status. It is comprehensive and concise(3). KPSS is a physician dependent scale originally designed to assess quality of life in patients receiving chemotherapy. It ranges from a score of 0 (at death) to 100, which implies full functional capacity to carry out normal daily activities without clinical evidence of disease. Its demerits include independence of patients' judgment and the inadequate assessment of the psychological state(3,4).

In 1991, WHO initiated a cross-cultural project to develop QOL tool (WHOQOL) for generic use. The clinically applicable short form has two global items (overall quality of life and general health) and four domains (physical, psychological, social relations and environment). In Taiwan, Yang et al(5) demonstrated that this instrument was reliable and valid for long term study in the HD population.

The Kidney Disease Quality of Life (KDQOL) instrument was designed by Hays et al(6,7). It is a

self-reported measure developed for individuals with kidney diseases on dialysis. It consists of 43 kidney disease-targeted items as well as 36 items that provide a generic core. These include: symptoms and problems, effects of kidney disease on daily life, burden of kidney disease, work status, cognitive function, quality of social interaction, sexual function, sleep, social support, dialysis staff encouragement, patient satisfaction. The limitation to its use has been the length and the amount of time it takes to complete the questionnaire. This has led to the development of shorter versions.

Studies on QOL of HD patients use one or more of these instruments. In a study of 660 end stage renal disease (ESRD) patients at the Sheffield Kidney Institute, the 36-item SF-36 was found to be practical and consistent for measuring the health-related quality of life of transplanted and dialysis patients.(8) **Error! Bookmark not defined.** SF-36 was also found to maintain its psychometric properties when administered on 304 dialysis patients in Italy.(9)

Several studies done in different populations using the different Quality of Life Instruments shows significant reductions in the HRQOL scores among patients with Chronic Kidney Disease with a progressive decline in the scores as the patients approaches End-Stage Renal Disease.(10–12)

The study was designed to assess the Quality of life of patients on Maintenance Haemodialysis and also identify characteristics that may be associated with their worsening quality of life.

METHODOLOGY

Study Design: This was an observational cross-sectional study

STUDY AREA: This study was conceived and conducted at the renal Centre of Obafemi Awolowo University Teaching Hospitals' Complex (OAUTHC) Ile-Ife, St Nicholas Hospital, Dialyzer medical centre, Life Support Medical Centre, Gbagada General Hospital and Eko Hospital, all in Lagos.

STUDY POPULATION: This consisted of patients who presented with end stage renal disease on Haemodialysis for a duration ≥ 3 months at the Haemodialysis Unit of the various hospitals mentioned above.

Inclusion Criteria: Patients older than 18 years with End Stage Renal Disease having 2-3 sessions of HD a week who have been on maintenance HD ≥ 3 months

Exclusion Criteria: Patients on Peritoneal Dialysis, who are not dialysis dependent, with evidence of active malignancy or infection, or history of hospitalization in the last thirty (30) days. Those with chronic liver disease, cerebrovascular disease, NYHA Class IV Congestive Heart Failure and HIV positive patients with Gastrointestinal involvement.

Procedure: Samples were taken from the patients for the following investigations: serum Electrolytes, urea and creatinine, uric acid, calcium, phosphate, serum proteins, packed cell volume just before commencement of the HD procedure.

Quality of Life Questionnaires: a generic instrument for the assessment of QOL, SF-36 Health Survey Questionnaire, was then administered to the patients. The cumulative scores for the different domains of the SF-36 QOL questionnaire were collated and recoded for all the patients as recommended in the SF-36 Health Survey Manual and Interpretation Guide.(13,14) The scores were then expressed as percentages on a transformed scale using the formula:

$$\text{Transformed Scale} = \left[\frac{(\text{Actual raw score} - \text{Lowest possible raw score})}{\text{Possible raw score range}} \right] \times 100$$

Data analysis: Data was analyzed using SPSS for Windows version 17 and presented as percentages, tables and figures. Ethical Consideration: The Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospitals' Complex (OAUTHC) Ile-Ife approved this study with the Registration Numbers: International – IRB/IEC number 00005422 and National Number – NHREC/27/02/2009a.

RESULTS

QUALITY OF LIFE DOMAINS

The SF-36 scores for the 8 domains were converted to a scale of 0 to 100. The mean (\pm SD) of the various domains are shown were in Table 1. On assessing the effect of gender on the different domains, males had a significantly higher Mental Health scores than females (p-value = 0.049) while nodifference was observed in the other 7 domains (Table 2).

Table 1: SF-36 QUALITY OF LIFE SCORES FOR DIFFERENT DOMAINS

DOMAIN	MEAN ± STANDARD DEVIATION	MEDIAN	RANGE
Physical functioning	50.0± 27.9	50	0 – 95
Role functioning - physical	36.6 ± 40.4	25	0 – 100
Bodily pain	60.3 ± 26.9	62	0 – 100
General Health	47.4 ± 22.8	42	15- 87
Vitality	51.1± 19.7	50	15 – 90
Social functioning	39.0± 30.6	37.5	0 – 100
Role functioning - Emotional	52.9 ± 42.8	66.7	0 – 100
Mental Health	70.3 ± 18.2	72	32 – 100

TABLE 2: THE DIFFERENCE BETWEEN SF-36 SCORES AND GENDER USING MANN-WHITNEY U-TEST

SF-36 DOMAIN	MALE	FEMALE	P-VALUE
Physical functioning	52.1 ± 22.9	47.1 ± 34.2	0.551
Role functioning - physical	38.5 ± 36.9	33.8 ± 45.9	0.435
Bodily pain	62.0 ± 30.0	58.1± 22.3	0.603
General Health	51.9 ± 22.9	41.1 ± 21.7	0.149
Vitality	54.6 ± 19.5	46.2 ± 19.6	0.253
Social functioning	43.8 ± 28.1	32.4 ± 33.7	0.203
Role functioning - Emotional	61.1 ± 42.5	41.2 ± 41.7	0.138
Mental Health	75.2 ± 16.1	63.5 ± 19.2	0.049

THE RELATIONSHIP BETWEEN LABORATORY PARAMETERS, DOSE OF DIALYSIS AND QUALITY OF LIFE SCORES

On analysis of the relationship between the various patient characteristics and SF-36 Quality of Life scores, the frequency of HD per week had a number of significant correlations. The frequency of HD per week was significantly correlated with Physical functioning ($r = 0.436$; $p=0.004$), Role – physical ($r= 0.435$; $p=0.004$), Bodily Pain ($r=0.358$; $p=0.022$), General Health ($r=0.361$; $p=0.021$), Social Functioning ($r=0.576$; $p<0.001$), Role – Emotional ($r=0.518$; $p<0.001$) and Mental Health ($r=0.313$; $p=0.046$). On multiple Regression analysis with Frequency of HD per week as the dependent variable, the significance

persisted with β -values of 0.454, 0.476, 0.333, 0.374, 0.581, 0.499 and corresponding p-values of 0.003, 0.002, 0.033, 0.016, <0.001 and <0.001 for Physical functioning, Role–physical, bodily pain, general health, social functioning and role–emotional respectively.

For the Laboratory parameters, total serum protein, serum albumin levels and packed cell volume correlated with more than one SF-36 quality of life domain. Total serum protein and packed cell volume correlated with physical functioning, role–physical, general health, vitality, social functioning, role- emotional and mental health while serum albumin level correlated with physical functioning, role–physical, bodily pain, vitality and role-emotional as shown on tables 3a and 3b. Their relationship on Linear Regression analysis is as shown on table 4.

TABLE 3a: RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS AND SF-36 SCORES

	Physical Functioning	Role - Physical	Bodily Pain	General Health
Frequency of HD/week	$r = 0.436$ $p = 0.004$	$r = 0.435$ $p = 0.004$	$r = 0.358$ $p = 0.022$	$r = 0.361$ $p = 0.021$
Total Protein (g/l)	$r = 0.395$ $p = 0.012$	$r = 0.399$ $p = 0.011$	NS	$r = 0.423$ $p = 0.007$
Albumin (g/l)	$r = 0.396$ $p = 0.012$	$r = 0.373$ $p = 0.018$	$r = 0.356$ $p = 0.024$	NS
Packed cell volume (%)	$r = 0.360$ $p = 0.021$	$r = 0.574$ $p < 0.001$	NS	$r = 0.444$ $p = 0.004$

TABLE 3b : RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS AND SF-36 SCORES

	Vitality	Social Functioning	Role - Emotional	Mental Health
Frequency of HD/week	NS	$r = 0.576$ $p < 0.001$	$r = 0.518$ $p = 0.001$	$r = 0.313$ $p = 0.046$
Total Protein (g/l)	$r = 0.398$ $p = 0.011$	$r = 0.517$ $p < 0.001$	$r = 0.360$ $p = 0.023$	$r = 0.622$ $p < 0.001$
Albumin (g/l)	$r = 0.381$ $p = 0.015$	NS	$r = 0.318$ $p = 0.045$	NS
Packed cell volume (%)	$r = 0.362$ $p = 0.020$	$r = 0.443$ $p = 0.004$	$r = 0.468$ $p = 0.002$	$r = 0.458$ $p = 0.003$

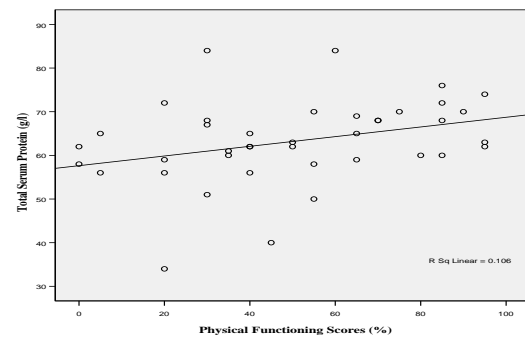
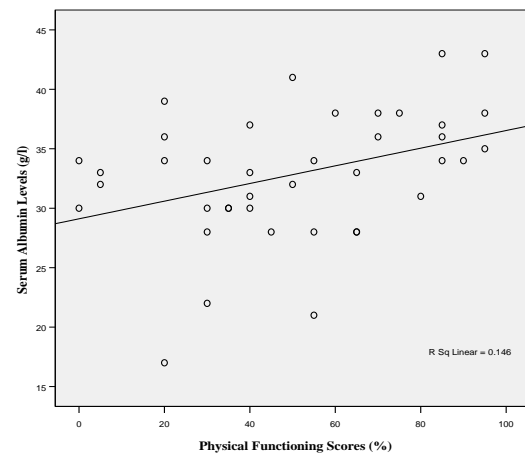
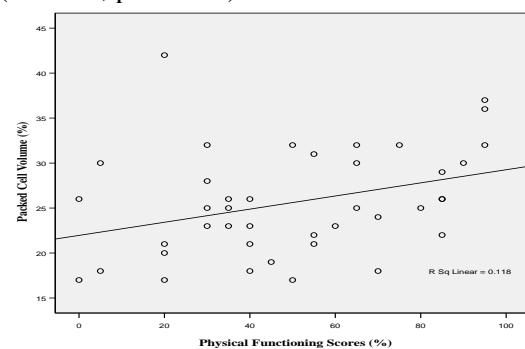
**FIGURE 1: CORRELATION BETWEEN TOTAL SERUM PROTEIN LEVEL AND PHYSICAL FUNCTIONING SCORES ($r=0.395$; $p = 0.012$)****FIGURE 2: CORRELATION BETWEEN SERUM ALBUMIN LEVEL AND PHYSICAL FUNCTIONING SCORES ($r=0.396$; $p = 0.012$)****FIGURE 3: CORRELATION BETWEEN PACKED CELL VOLUME AND PHYSICAL FUNCTIONING SCORES ($r=0.360$; $p = 0.041$)**

TABLE 4: THE RELATIONSHIP BETWEEN VARIOUS PATIENTS' CHARACTERISTICS AND QUALITY OF LIFE SCORES ON MULTIPLE REGRESSION ANALYSIS

	β -value	p-value
TOTAL PROTEIN LEVEL		
Physical Functioning	0.325	0.041
Role-Physical	0.394	0.012
General Health	0.388	0.013
Vitality	0.414	0.008
Social functioning	0.449	0.004
Role-Emotional	0.312	0.050
Mental Health	0.613	<0.001
SERUM ALBUMIN LEVEL		
Physical Functioning	0.382	0.015
Role-Physical	0.407	0.009
Vitality	0.360	0.022
Role-Emotional	0.345	0.029
PACKED CELL VOLUME		
Physical Functioning	0.343	0.028
Role-Physical	0.502	0.001
General Health	0.390	0.012
Vitality	0.323	0.039
Social functioning	0.397	0.010
Role-Emotional	0.461	0.002
Mental Health	0.461	0.002

DISCUSSION

QUALITY OF LIFE SCORES

Chronic kidney diseases are increasingly becoming common in Nigeria and to varying degrees affect the quality of life of patients, however, the health-related quality of life (HRQOL) studies of the patients is infrequent. Ademola et al (11) showed a progressive decline in the scores of all HRQOL domains in advancing CKD using KDQOL instrument.

The compromised HRQOL of patients with ESRD has been demonstrated by several studies in other climes using generic instruments like SF-36 and disease specific instruments like KDQOL-SF. ESRD patients on HD are found to have poorer HRQOL compared to the general population **Error! Bookmark not defined.** (10,12) Comparing our scores for the different quality of life

domains with some large-scale studies, our patients had much lower values than values from the US general population. (13) **Error! Bookmark not defined.** Scores were however higher than those from DOPPS (15) except for Social Functioning.

This difference may be justified by the small size of the population studied as compared to that of the above-cited studies, however, there may be several other factors responsible. The better results from our study may be due to the exclusion of patients with significant co-morbidities like congestive cardiac failure, cerebro-vascular disease, chronic liver disease, active infections and malignancies, selecting for a relatively healthier group

Social functioning subscale of the SF-36 assesses patients' judgements about the impact of either physical health or emotional problems on their social activities. The lower

Social Functioning score could be attributed to social withdrawal behaviours common in chronic illness, possibly due to stigma or personal coping strategies.

The significant difference seen in Mental Health scores between males and females was not surprising, as females tend to be more affected emotionally when exposed to stressful conditions.

THE RELATIONSHIP BETWEEN LABORATORY PARAMETERS, DOSE OF DIALYSIS AND QUALITY OF LIFE SCORES

A number of parameters have been shown to affect the Quality of life of ESRD patients on maintenance dialysis.

There was a significant relationship between frequency of dialysis and SF-36 QOL scores which was maintained on multiple regression analysis, suggesting that more frequent dialysis sessions may enhance patient quality of life through better symptom control.

The other study in Africa (Egypt)(3) using the SF-36 instrument **Error! Bookmark not defined.** had better scores in Physical functioning, Bodily pains, social functioning and Role – emotional, but lower scores in Role –Physical, General Health, Vitality and Mental Health. The difference maybe due to differences in the practice and pattern of HD as demonstrated by DOPPS(15–17). Other Studies from different Countries in Africa – Nigeria,(11) Ethiopia(18) and Rwanda(19) used KDQOL instrument. The studies had similar results showing generic scores lower than the general population and progressively declining Disease specific components with advancing CKD stages.

Some laboratory parameters, serum haemoglobin levels and serum albumin levels have been clearly shown to have a significant relationship with several domains of the SF-36 QOL domains in several studies.(20) **Error! Bookmark not defined. Error! Bookmark not defined.** This was also found in this study where packed cell volume had a significant positive relationship with all the SF-36 QOL scores except Bodily Pain. Improvement in haematocrit leads to improved cardiovascular status, physical fitness and exercise tolerance leading to improvement in overall quality of life and morbidity.(3) This is similar to the findings by Song et al in China.(21)

Serum Albumin level in our study had a positive correlation with Physical Functioning, Role – Physical, Bodily Pain, Vitality and Role - Emotional scores. Serum albumin is a major predictor of mortality and morbidity in the dialysis population and low levels are associated with poor outcome.(22,23)

Limitations of the study: The SF-36 QOL questionnaire was not structurally adapted to our setting and so, linguistic, semantic and conceptual equivalence could not be ascertained. For instance, limitation to moderate activity is assessed by unfamiliar activities such as “pushing a vacuum cleaner, bowling or playing golf”. Assessment of Mental Health uses uncommon expressions like “down in the dumps” and ‘downhearted and blue”. The higher scores may also be coloured by our cultural beliefs, where one is expected not to express negative feelings.

Conclusion: HRQOL is suboptimal in our end stage renal disease (ESRD) patient population. The packed cell volume and serum albumin levels were significantly correlated with the HRQOL.

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