

Quality of Life in Chronic Kidney
Disease:
CKD, ESRD,
Anemia and Erythropoietin

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QOL

QOL can be defined as the physical, psychological, social and spiritual domains of health that are influenced by a person's experiences, beliefs, expectations and perceptions.

Quality of Life: Measurement Concepts

- **Subjective vs objective**
- **Functional vs well-being**
- **Satisfaction**

- **General Population**
- **Chronic illness population: Health-related QOL (HRQOL)**

- **Generic**
- **Disease-based**

- **Functional, psychological, social (FDA 2006)**

Health-related Quality of Life Domains

- **Physical functioning**
- **Mental health**
 - **General affect (mood)**
 - **Perception of well-being (illness effects or burden of illness)**
 - **Life satisfaction (happiness)**
- **Social relationships**
- **Patient satisfaction**

Measures

- **Illness Effects Questionnaire (IEQ)** to assess perception of illness effects.
 - Subjective, generic
 - High test-retest reliability
 - 20 item, 7 pt Likert scale, 0-140
 - Correlates with SWLS, BDI and other QOL measures
 - Predicts survival in ESRD patients

Measures

- **Satisfaction With Life Scale (SWLS)**
to assess satisfaction with life.
 - Subjective, generic
 - 5 item
 - used in ESRD studies
 - correlates with well-being scales
 - Increases with age
 - Not correlated with Karnofsky
 - Does not predict survival

Measures

- **Patient Satisfaction**
- DiMatteo and Hays
- Modification -- satisfaction with nephrologist vs satisfaction with staff
- Satisfaction with nephrologist correlates with behavioral compliance and Salb

Measures

- Single sentence quality of life scale
- Alvan Feinstein
- Used in Yale and GW ESRD studies
- LASA (Energy, Activity, Overall QOL)
- Simple
- Enormous face validity
- Comprehensible to patients
- Range of responses
- Correlations of SQQOLS with SWLS and IEQ

Single Question QOL Score

- “considering all parts of my life – physical, social, spiritual and financial – over the past two days the quality of my life has been...”
- QLS ranges from zero (very bad) to ten (excellent).

QOL Measures

Approach in Research Studies

Multiple simultaneous measures

Use of a single item question that asks the subject about his/her perception of QOL

Measures used in studies of patients with Chronic Kidney Disease :

1. RAND 36-Item Health Survey (SF-36)
2. The Kidney Disease Quality of Life (KDOQL) Instrument (dialysis version)
3. Sickness Impact Profile (SIP)
4. Kidney Disease Questionnaire (KDQ)

Measures

- **KDQOL** -- 134 items
 - short form 79 items
- Widely used in ESRD studies
- Cumbersome, time-consuming administration
- Scoring
- Constructs of SF-36
- Constructs of Kidney-specific domains
- KDQOL vs established comprehensible well-validated psychological domains/constructs

Measures

- KDAQOL -- Based on SF-36 -- generic, subjective
 - PCS/MCS
- Kidney-specific domains
 - symptoms/problems
 - Effects of KD on daily life
 - Burden of KD
 - Cognitive function
 - Work status
 - Sexual function
 - Quality of social interaction
 - Sleep
 - Social Support
 - Dialysis staff encouragement
 - Patient satisfaction

Measures

- **Sickness Impact Profile (SIP)**
 - Global
 - Physical
 - Psychosocial

Measures

- **Kidney Disease Questionnaire (KDQ)**
 - Physical symptoms
 - Fatigue
 - Relationships
 - Depression
 - Frustration

Measures of QOL in Patients with Renal Disease

- The appropriate measure of QOL in patients with CKD is unknown
- Most appropriate strategy is to use multiple well-validated measures to depict the range of patient perceptions

Factors Associated with Differential QOL in CKD Patients

Age and QOL

Gender and QOL

Race and QOL

Functional status and QOL

Anemia, Erythropoietin and QOL

Modality

Stage of Disease

Marital Satisfaction and QOL

Depression and QOL

Social Support and QOL

Spirituality and QOL

Sleep and QOL

Pain and QOL

Anemia and QOL in CKD

- Intense interest since release of erythropoietin**
- Nephrology and Oncology Patients**
- Questions regarding linear associations vs quantum effects**
- Epo-treated vs epo naïve patients**
- ESRD vs CKD**
- Risk/benefit considerations now in spotlight**
- Survival effects**
- Primacy to clinical trials**

Anemia and QOL in CKD - Conclusions

Methodologic issues, bias, conflict of interest

Double blind? Experimental demand?

Few data suggest linear association of Hct and QOL

Step function? Normalization vs Partial Correction

Type of QOL measure used and analytic strategy varies considerably – consistent effect on Vitality?

ESRD vs CKD Patients

Effects of early stage treatment?

Risk/benefit considerations now in spotlight

Survival effects balanced against QOL perceptions?

Critical research question: lowest Hb vs current approaches

Patient/Physician collaboration in choice of target and monitoring

Cooperative Multicenter EPO Clinical Trial Group Evans, Rader, Manninen JAMA 1990

More than 300 Patients, 9 centers

Phase II trial

Statistically significant improvements in energy and activity level, functional ability, sleep and eating behavior, disease symptoms, health status, satisfaction with health, sex life, well-being, psychological affect, life satisfaction and happiness

Canadian EPO Study

BMJ 1990

- 118 Patients, HD, anemia, 18-75 yo**
- GN, IN, PKD**
- Placebo, low group (9.5-11 g/dL), high group (11.5-13 g/dL)**
- Double blind, randomized**
- Exclusions QOL not due to CKD**
- Analyses baseline, 2, 4, 6 m**
- Placebo vs lo epo, Placebo vs hi epo, hi vs lo**
- KDQ, SIP, TTO, 6 min walk, exercise stress test**
- PTs had to complete all phases (not ITT)**
- Achieved Hb 7.4, 10.2, 11.7 g/dL**

Canadian EPO Study BMJ 1990

No differences any QOL parameter hi vs lo groups

Differences in 4/5 KDQ domains placebo vs epo grps
(Physical, Fatigue, Depression, Relationships)

Differences in global, physical domains of SIP,
placebo vs epo grps

No difference SIP psychosocial score

No improvement TTO

Correlations: change in Hb and change in global,
physical, psychosocial scores SIP, Physical, Fatigue,
Depression, Relationships scores of KDQ

Highest correlations $r = 0.32$, $p < 0.001$, $r = 0.31$,
 $p < 0.002$ Δ fatigue and physical symptoms KDQ
and Δ Hb

Canadian EPO Study

- . Small study (underpowered?)**
- . Epo effect; no difference between dose targets**
- . Linear relationships Hb and QOL measures not reported**
- . Correlations of change in Hb and some QOL measures**
- . No effects psychosocial parameters**
- . Differential AEs high vs low groups**

National Cooperative RHuEpo Study

Beusterien, et al JASN 1995

Approx 2100 Patients; 203 US Dialysis Centers

484 Patients new to EPO had HRQOL measures

520 Patients previously treated with EPO - QOL

Non-random sample

SF-36, Baseline (7 d from Epo tx) and 99 d (49-180 d)

Analyses – regression change in Hct and QOL

New to EPO

53% White/Hispanic 43% Black

DM 36%, 11% HBP, 26% GN, 20% Unknown

85% HD

Baseline Hct $25.5 \pm 3.8\%$

National Cooperative RHuEpo Study

Beusterien, et al JASN 1995

- 484 Patients new to EPO**
 - Significant improvement**
 - Change Hct $4.6 \pm 4.4\%$**
 - Physical Functioning $3.7 \pm 19.6^*$**
 - Vitality $9.3 \pm 22.3^*$**
 - Social Functioning $7.5 \pm 22.3^*$**
 - Mental Health $4.1 \pm 19.4^*$**
 - MCS $3.7 \pm 12.0^*$ (* = $p < 0.001$)**
 - No change Bodily Pain, General Health, PCS**
- 520 Patients previously treated with EPO**
 - No significant change in Hct or SF-36 scores**
 - Similar to achieved new to EPO patient scores**

National Cooperative RHuEpo Study Beusterien, et al JASN 1995

1004 Patients - Regression analyses

**Change Hct associated with variance
in Vitality, and change scores for
General Health, Vitality and Social
Functioning, adjusted for group**

National Cooperative RHuEpo Study

Beusterien, et al JASN 1995

- Not Randomized, Blinded**
- Possible selection bias**
- Mixture HD/PD Patients**
- No analysis in Incident group change function, no analysis linearity between Hct and QOL indices**
- “Other factors, not yet identified” associated with variations in HRQOL**

Normalization of Hematocrit Values in HD Patients with Cardiac Disease Besarab, et al NEJM 1998

1233 HD Patients; CHF or IHD 51 Dialysis Centers

Prospective, randomized, open-label

618 Patients Target Hct 42%

615 Patients Target Hct 30%

Planned 3 years

End point: Time to death or first non-fatal MI

SF-36, Baseline and every 6 m

Trial stopped 3rd interim analysis

ITT, Cox Analyses –

Normalization of Hematocrit Values in HD Patients with Cardiac Disease Besarab, et al NEJM 1998

Baseline Hcts 27-33% on EPO

4 d – 30 m (median 14 m)

65 \pm 12 y, 50% women

45% White, 41% Black, 8% Hispanic

DM 42%, 28% HBP, 7% GN, 23% Other

Baseline Hct 30.5 \pm 3.0%

Normalization of Hematocrit Values in HD Patients with Cardiac Disease Besarab, et al NEJM 1998

1 and 2 y mortality 7% higher in normalization group

**Physical Function increased 0.6 at 12 m for each 1%
increase in Hct (p = 0.03)**

No significant change any other SF-36 score

Spanish Cooperative Study

Moreno et al JASN 2000

156 HD Patients; Stringent exclusions: Age > 60, cardiac disease, diabetes, uncontrolled HBP, CVA, seizures, severe comorbidity, access dysfunction

EPO at least 3 months, Hb \geq 9 g/dL

115 Pts finished study

Age 44 ± 15 y; Vintage 36 m (3-216 m)

Hct increased from 31 ± 2 to $38.5 \pm 2.5\%$

Mean SIP Physical and Psychosocial Dimension, and Karnofsky Scores increased significantly

Spanish Cooperative Study

Moreno et al JASN 2000

Hct increased from 31 ± 2 to $38.5 \pm 2.5\%$

Mean SIP Physical and Psychosocial Dimension, and Karnofsky Scores increased significantly

Regression: Δ QOL score and age, gender, comorbidity, hx failed transplant, SES, epo dose, increase in Hb or Hct, initial or final Hb or Hct, albumin, Kt/V, PCR

Only significant association: baseline QOL score and improvement

Eg: Improvement in Global SIP related to lower baseline Global score; improvement in Physical Dimension SIP related to lower baseline Physical Dimension score

Generalizability? Selection bias?

Hemoglobin in HD Patients with Asymptomatic Cardiomyopathy Foley, et al KI 2000

146 HD Patients; Multicenter

Prospective, randomized, open-label

73 Patients Target Hb 13 - 14 g/dL

73 Patients Target Hb 9.5 - 10.5 g/dL

48 w

End point: Echocardiographic parameters

KDQ, SF-36, HUI Baseline and 24, 48 w

Hb 9-11 g/dL at start of study

Sample size based on echo parameters

Hemoglobin in HD Patients with Asymptomatic Cardiomyopathy Foley, et al KI 2000

146 HD Patients

Drop out for QOL data

45 Patients Target Hb 13 - 14 g/dL at end of study

49 Patients Target Hb 9.5 - 10.5 g/dL at end of study

Separation groups Hb 1.8 g/dL at end of study

Echocardiographic parameters - no differences

**Variable improvement Fatigue, Depression,
Relationships on KDQ (trend significant)**

**No change Physical symptoms, Frustration, no
change any dimension SF-36, or HUI**

Hemoglobin in HD Patients with Asymptomatic Cardiomyopathy Foley, et al KI 2000

Flawed study

Drop out for QOL data

Bias

Small sample

QOL secondary analysis

Furuland EPO Study

NDT 2003

- "Normalization" study, 1995-1996**
- 416 Scandinavian Patients, Predialysis, HD, PD**
- Anemia, Hb 9-12 g/dL, 3 months, EPO naive**
- Predialysis: SCr > 300 mmol/L, CCr < 30 ml/min**
- Low group (9-12 g/dL), high group (13.5-16 g/dL)
(M vs F)**
- Multi-center, randomized, open-label**
- Swedish study (77.4% of centers) extended from 48
to 76 w**
- KDQ in 253 Swedish Patients - baseline and 1 year**
- High withdrawal rate**

Furuland EPO Study

NDT 2003

- . Analyses: baseline vs 48 w between treatment grps**
- . Intention to Treat analyses, per protocol analyses**
- . 210 Patients completed study -- Discontinuation (any reason) higher in normalization group -- High withdrawal rate**
- . 72 Predialysis, 293 HD, 46 PD**
- . 64% DM, HBP, GN -- 36% other**
- . Achieved Hb 14.3 vs 11.7 g/dL CKD, 13.5 vs 11.3 dL HD, 13.4 vs 11.5 g/dL PD**
- . KDQ in 117 Swedish HD Patients (46%)**
- . Improved physical, fatigue, depression, frustration scores in normalization group**

Furuland EPO Study

NDT 2003

- Improved physical, fatigue, depression, frustration in normalization group**
- "In general, patients in the S-Hb group worsened, while patients in N-Hb stayed the same or improved time."**
- Wk 48, KDQ scores correlated with Hb levels in N-Hb group ($r = 0.32-37$, $p < 0.02$)**
- Per protocol analyses "all KDQ parameters were significantly better for those in the N-Hb group that reached target Hb compared with the ones that did not."**

Furuland Scandinavian EPO Study

Methodologic issues

Underpowered? Bias 2^o withdrawal?

No difference AEs high vs low group

BP effect in CKD, PD patients

No obvious difference in mortality

Lower mortality in N-Hb group in patients who reached target

Improvement in QOL measures with Hb normalization

Double-Blind Comparison Full vs Partial Anemia Correction Incident HD Patients without Sx Heart Disease Parfrey, et al JASN 2005

Incident HD Pts without sx cardiac disease, 96 centers

EPO target goal 24 w – maintenance 72 w

Hb 8-12 g/dL; HD 3-18 m; LVVI < 100 ml/m²

**596 HD Patients; CHF or IHD; 89% white; 30% Canadian, 70%
European**

Prospective, randomized, double-blind

29% GN; 18% DM; PKD 9%; HBP 8%

300 Patients Target Hb 9.5-11.5 g/dL

296 Patients Target Hb 13.5-14.5 g/dL

End point: Left ventricular volume index

**KDQOL, Functional Assessment Chronic Illness Therapy
(FACIT) Fatigue Score, 6 min walk, Baseline and every 6 m**

Double-Blind Comparison Full vs Partial Anemia Correction Incident HD Patients without Sx Heart Disease Parfrey, et al JASN 2005

596 HD Patients, 18% diabetic nephropathy

92% previously treated with EPO

50.8 y, HD for 0.8 y, LVVI 69 ml/m²

Baseline Hb 11.0 g/dL

Achieved Hb 10.9 ± 1.2 and 13.3 ± 1.5 g/dL at 24 w

Percent changes in LVVI similar in both groups

**Only change SF-36 scores, Vitality -2.31 vs 1.21
(p = 0.036) - 24, 36, 48, 60, 72 m**

Double-Blind Comparison Full vs Partial Anemia Correction Incident HD Patients

Parfrey, et al JASN 2005

No change KDQOL Quality of Social Interaction Score

No change FACIT Fatigue Score

No change LVVI

No change 6 min walk

No change incidence CHF

**“available literature suggests....enhanced QOL is the only
consistent benefit conferred by normalizing hemoglobin in
patients with chronic kidney disease”**

Only limited assessment QOL

Young age group

HRQOL associated with rHuEpo for predialysis chronic renal disease patients Revicki, et al AJKD 1995

83 Patients

Prospective, randomized, multicenter, open-label; naïve to Epo

43 Patients EPO: Target Hb 35-36%

40 Patients untreated control group

18-75 y, Cr 3-8 mg/dL, Hct < 30%

HRQOL assessed baseline, 16, 32, 48 w

Home mgt, alertness behavior, social interaction scales SIP

Physical and Role Function, Energy, Health Distress -- SF 36

Campbell's Life Satisfaction Scale

Center for Epidemiologic Studies Depression Scale

Sexual Dysfunction Scale

ITT analysis, treatment group differences adj for baseline

HRQOL with rHuEpo tx for predialysis chronic renal disease patients

Revicki, et al AJKD 1995

**43 Patients EPO: - 56.5 + 11.4 y, 65% female, 70% white,
70% HS grad, Hct 26.8 ± 4.5%, SCr 5.5 ± 1.6 mg/dL**

**40 Patients untx'd control group - 58.4 ± 13.2 y, 70% female
80% white, 75% HS grad, Hct 26.8 ± 3.6%, SCr 5.5 ± 1.8 mg/dL**

**Significant increase in Hct ($p < 0.001$); no change in controls
Increase 4.7% in tx'd group; 1% decrease in control**

**Control group: No Δ except significant decrease in Physical
Function**

**Tx grp: Significant improvement in energy, physical function,
and cognitive function**

HRQOL with rHuEpo tx for predialysis chronic renal disease patients

Revicki, et al AJKD 1995

Differences between groups: Energy ($p = 0.038$), Physical function ($p = 0.005$)

Regression analyses: Significant increase in Physical Function and energy in Tx grp

Correlation between Δ Hct and QOL scores @ 48 w:

Energy ($r = 0.37$, $p < 0.02$), Physical Function ($r = 0.35$, $p < 0.03$), sexual dysfunction ($r = -0.45$, $p < 0.02$) and social activities ($r = 0.39$, $p < 0.02$)

Beautifully designed

Small sample

Generalizability?

Partial use of instruments

EPO and LVM in CKD (3 & 4)

Roger, et al JASN 2004

155 CKD Patients; 18-75, CrCl 15-50 mL/min, Hb < 10 dl in past, 11-13 (men) or 10-12 g/dL (women) (on EP

Prospective, randomized, open-label - Australia, NZ

75 Patients Target Hb 12 to 13 g/dL

80 Patients Target Hb 9 to 10 g/dL

GN, DM, PKD, Drug-induced, Renovascular

Planned 2 years

End point: LV mass at 2 y

Renal function, SF-36 and Renal Quality of Life Profile

EPO and LVM in CKD (3 & 4)

Roger, et al JASN 2004

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Prospective, randomized, open-label - Australia, NZ

75 Patients Target Hb 12 to 13 g/dL

80 Patients Target Hb 9 to 10 g/dL

Marginal difference Hb achieved? (12.1 ± 1.4 vs 10.8 ± 1.3 g/dL, $p < 0.001$)

LV mass at 2 y not different between groups

Renal function not different between groups

**SF-36 (PCS and MCS?); Renal Quality of Life Profile
no difference in Δ from baseline between groups**

EPO and LVM in CKD (3 & 4)

Roger, et al JASN 2004

Underpowered?

Marginal difference Hb achieved? (12.1 ± 1.4 vs 10.8 ± 1.3 g/dL, $p < 0.001$)

Quality of Life analysis -- 2° and unclear

Early Correction of Anemia and Progression of CKD Rossert, et al AJKD 2006

**241 CKD Patients; 18-75, eGFR 25-60 mL/min, Hb < 13 g/dL
(men) or 12.5 g/dL (women); 93 centers, global**

PKD, previous epo therapy with Hb > 12 g/dL excluded

Prospective, randomized, open-label

108 Patients Target Hb 13 to 15 g/dL

133 Patients Target Hb 11 to 12 g/d

Planned 3 years

End point: Rate of GFR decline (iohexol)

**RRT, morbidity, CVE, SF-36 (Physical Domains), nutritional
status -- Baseline and every 9 m**

Trial stopped – concern re antibodies

ITT, Cox Analyses –

Early Correction of Anemia and Progression of CKD

Rossert, et al AJKD 2006

7-8.6 m

0.2 and 2.0 to 2.7 g/dL Δ in Hb (women and men)

Baseline Hb approx 11.5 g/dL; Age approx 58 y

Overwhelmingly white; approx 2/3 DM, GN, HBP

eGFR approx 29; GFR 18.7 ml/min/1.73m²

Early Correction of Anemia and Progression of CKD

Rossert, et al AJKD 2006

No difference Δ in GFR high and low Hb groups

Mean Vitality score higher in high Hb group (p=0.042)

Trends for Physical Function and Role Physical

**During maintenance, no between group differences
changes in any QOL domain, except for Physical
Function, which decreased in high Hb group**

**Δ Role Emotional correlated with Δ Hb
(r=0.15, p=0.046)**

**Final Hb correlated with Role Physical, Vitality,
Bodily Pain, Social Function and Role Emotional**

Early Correction of Anemia and Progression of CKD Rossert, et al AJKD 2006

Early termination

Small numbers

Methodologic issues

Underpowered?

Correction of Anemia Epoetin in CKD

Singh, et al NEJM 2006

1432 CKD Patients; 130 sites

**Prospective, randomized, open-label; naïve to Epo,
< 11.0 g/dL, eGFR 15-50 ml/min/1.73 m²**

715 Patients Target Hb 13.5 g/dL

717 Patients Target Hb 11.3 g/dL

Planned 3 years

**End point: Time to composite death, MI,
hospitalization for CHF or stroke**

2^o – time to RRT, QOL, hospitalization

LASA, KDQ, SF-36 scores Baseline and final

Trial stopped 2nd interim analysis

ITT, KM, Cox Analyses – log rank tests

Correction of Anemia Epoetin in CKD

Singh, et al NEJM 2006

1432 CKD Patients; Median duration 16 m

715 Target Hb 13.5 g/dL; 717 Target Hb 11.3g/dL

**Baseline Hb 10.1 ± 0.9 g/dL; eGFR 27 ml/min/1.73 m²
creatinine clearance approx 37 ml/min/1.73 m²**

Increase Hb 2.5 and 1.2 g/dL in high and low groups

Events high vs low: HR 1.34, CI 1.03-1.74, p = 0.03

NS – proportion Pts advanced to RRT

**LASA, KDQ and SF-36 scores showed similar
improvement from baseline in both groups, except
for Role Emotional (higher in low target group)**

Correction of Anemia Epoetin in CKD

Singh, et al NEJM 2006

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**Baseline Hb 10.1 ± 0.9 g/dL; eGFR 27 ml/min/1.73 m²
creatinine clearance approx 37 ml/min/1.73 m²**

Increase Hb 2.5 and 1.2 g/dL in high and low groups

Low Hb group: LASA scores, KDQ total score and all SF-36 scores changed in expected direction, p values between 0.01 and 0.001

High Hb group: LASA scores, KDQ total score and all SF-36 scores changed in expected direction, p values between 0.02 and 0.001, except pain (0.63), social function (0.23) and Role emotional (0.81)

Correction of Anemia Epoetin in CKD

Singh, et al NEJM 2006

715 Target Hb 13.5 g/dL; 717 Target Hb 11.3g/dL

**Baseline Hb 10.1 ± 0.9 g/dL; eGFR 27 ml/min/1.73 m²
creatinine clearance approx 37 ml/min/1.73 m²**

Increase Hb 2.5 and 1.2 g/dL in high and low groups

**No difference LASA scores, KDQ total score and all
SF-36 scores in high and low groups**

Increased risk without incremental QOL benefit

CREATE - Drueke, et al NEJM 2006

**603 CKD 3 or 4 Patients; 94 Centers; Planned 3 years
Prospective, randomized, open-label; eGFR 15 – 35 ml/min/1.73m²**

Previous epo tx, significant CV disease excluded

301 Patients Target Hb 13 – 15 g/dL

302 Patients Target Hb 10.5 – 11.5 g/dL

End point: Composite 8 CV events

2° included SF-36, Progression of disease

ITT, Cox Analyses –

Approx 59 y, eGFR 24-25 ml/min/1.73m², Hb 11.6 ± 0.6 dL, GN, HBP, DM, PKD

CREATE - Drueke, et al NEJM 2006

301 Patients Target Hb 13 – 15 g/dL

302 Patients Target Hb 10.5 – 11.5 g/dL

Approx 59 y, eGFR 24-25 ml/min/1.73m², Hb 11.6 ± 0.6 dL, GN, HBP, DM, PKD

Difference median Hb 1.9, 1.7 and 1.5 g/dL year 1, 2 and end of study

No difference CV events, no change in LVMI, Δ eGFR

Increased rate of RRT in high group

High Hb group: SF-36 General Health, Physical Function, Mental Health, Social Function, Vitality, Physical Role increased, p = 0.003, < 0.001, p < 0.001, 0.006, < 0.001, 0.01

Anemia and QOL in CKD

CHOIR vs CREATE

What explains the differences in findings regarding QOL???

ACCORD Ritz et al AJKD 2007

172 Stage 1-3 CKD DM Patients – Hb 10.5 – 13 g/dL

CrCl < 30 mL/min

Prospective, randomized, open-label

89 Patients Target Hb 13 – 15 g/dL

83 Patients Target Hb 10.5 – 11.5 g/dL

15 m followup

End point: Change from Baseline LVMI

Total SF-36 score, Baseline and end of study

ITT Analyses – baseline SF-36 score covariate

Age 57-58, Approx 30% Type 1 DM, CrCl approx 50 mL/min, Hb approx 11.8 g/dL

ACCORD Ritz et al AJKD 2007

172 Stage 1-3 CKD DM Patients – Hb 10.5 – 13 g/dL

89 Patients Target Hb 13–15 g/dL – Baseline 11.7

Increase 1.7 g/dL – Achieved 13.5 g/dL

83 Patients Target Hb 10.5–11.5 g/dL

Increase 0.3 g/dL – Achieved 13.5 g/dL

No change from Baseline LVMI

Equivalent decrease CrCl each group

SF-36 General Health score increased 5.33 in high group vs decreasing 0.33 in low group (p = 0.04)

No difference in Vitality scores

QOL analysis difficult to assess from paper

Anemia and QOL in CKD

Strippoli et al Lancet 2007

“... QOL benefits have been consistently promulgated in support of normalisation of haemoglobin target concentrations in CKD. Such claims have not been supported by good quality evidence, as we have outlined in detail. Unvalidated scales, and selective reporting of outcomes (eg, some but not all domains, time points, and patients) have been major and consistent methodologic pitfalls, perpetuated by CREATE, and weaken the claim of QOL benefit with complete normalisation.”

Anemia and QOL in CKD

Strippoli et al Lancet 2007

“On the basis of the existing published trials... we contend that more trials of haemoglobin target concentrations in patients with CKD are no longer required, should be stopped, or at least it should be made fully and publicly explicit what reasons grant their continuation. it is time to move on.”

Anemia and QOL in CKD

Lancet 2007

Why was there no metaanalysis of EPO, anemia, QOL in CKD in this important issue?

Anemia and QOL in CKD - Conclusions

The need for research is definitely not over (Pace Strippoli)

Investigation of QOL in its own right, not as a secondary outcome or a measure of interest to an agency is needed

Harmonization of different QOL measures, different populations, inclusion of all data

Sponsor -- conflict of interest

Anemia and QOL in CKD - Conclusions

Methodologic issues, bias, conflict of interest

Double blind? Experimental demand?

Few data suggest linear association of Hct and QOL

Step function? Normalization vs Partial Correction

Type of QOL measure used and analytic strategy varies considerably – consistent effect on Vitality?

ESRD vs CKD Patients

Effects of early stage treatment?

Risk/benefit considerations now in spotlight

Survival effects balanced against QOL perceptions?

Critical research question: lowest Hb vs current approaches

Patient/Physician collaboration in choice of target and monitoring

PROBLEMS IN QUALITY OF LIFE/ANEMIA ASSESSMENT: (adapted from AJKD 49:194,2007)

- Target Hgb levels in CKD/diabetes (13.5-15 vs 10.5-11.5)
- Baseline Hgb 11.7, 11.9
- Achieved: 13.5, 12.1
- SF-36 used for quality of life at baseline and study end (15 mths)
- “significantly improved q of l in patients with higher Hgb”
- Only data reported is that mean change in general health score was +5.33 in higher Hgb pts vs -0.33 in lower Hgb patients
- Absolute scores and other measured domains not given

and Quality of Life in CKD Patients

- Besarab (1998), Foley (2000), Furuland (2003), Roger (2003), Parfrey (2005), Rossert (2006), Drueke (2006), Singh (2006)
- SF-36, KDQ, Renal QofL Profile, FACIT fatigue score, 6 min walking test, Katz ADL, LASA, Health Utilities Index

HEALTH UTILITY INDEX

- 21 item questionnaire that is composed of 8 attributes felt to be important by the general population (vision, hearing, ambulation, dexterity, emotion, cognition, pain, speech)
- Responses are converted into overall utility score, which can be converted into quality adjusted life years (QALYs) for an economic analysis

Kidney Disease Questionnaire (KDQ)

- 26 questions
- 5 scores: phys sx, fatigue, depression, frustration, relationship with others

LASA

- Evaluates 3 domains of qof L: energy level, ability to do daily activities, and overall quality of life
- Score from 0 to 100 mm

Review Article (summary)

- Available data do not support a consistent or important impact of normalization of Hgb levels on q of l
- But, these studies were not designed to look primarily at of q of l and thus are not rigorously done from a q of l standpoint
- Q of L has proved to be a major benefit of partial correction of anemia

Choir Study: Change from Baseline in the Two Groups

- Baseline Hgb of 10.1 with achieved of 12.9, 11.3
- LASA: 11-16 point increase in energy, activity, overall quality of life (SD 28-39)
- KDQ total score increase of 1.1, 1.6
- SF-36 virtually all domains increase (0.4-7.5)

Benz Study (CJASN, 3/2007)

- Designed to look at q 2 week Procrit dosing for CKD pts
- Hgb increase from 9.8 to 11.7
- 50 pts complete 28 weeks and q of l measures
- Increases in all 3 LASA scores (15-20)
- “Significant” improvement in 4 domains of SF-36 (phys func-7.8, role phys- 13.6, vitality-14.1, social func-10.6)

Lefebvre Study

(Curr Med Res Opin
2006)

- Post hoc analysis of data to examine q of I and anemia correction in CKD patients using LASA (n=1183) and KDQ (n=1044)
- Non-randomized, 16 week study
- Baseline Hgb 9.2; Achieved 11.7
- 3 LASA scores increase from 40 to 68
- KDQ scores all increased significantly (actual data not shown)
- Non-linear regression analysis indicated that based on a 2 unit change in Hgb the greatest incremental improvement in q of I occurred with Hgb of 11-12

Provenzano (Clin Nephrol, 2003)

- Open label, non-randomized study of 1557 CKD (not on dialysis) patients
- Hgb increase from 9.1 to 11.8
- QofL assessed by KDQ and LASA
- LASA scores (n=1184) increased by mean of 27 mm
- All 5 KDQ sign increased (overall score incr from 19.7 to 25.1)
- Regression analysis indicated sign relationships between q of I score and Hgb levels for both LASA and KDQ

QOL

Health is “not only the absence of disease and infirmity, but also the presence of physical, mental, social [and spiritual] well-being”

World Health Organization

Measures

- **Karnofsky**

- Oldest QOL measure
- Objective or subjective
- 0-100
- Replicable/valid
- Differences between observers

- **Depressive Affect**

- BDI -- well studied in ESRD
- Zung
- Hamilton

QOL

Early studies in ESRD patients

Johnson, McCauley, Copley: The quality of life of hemodialysis and transplant patients. *Kidney Int* 22:826-291, 1982

Simmons RG et al: Comparison of quality of life of patients on continuous ambulatory peritoneal dialysis, hemodialysis and after transplantation. *Am J Kidney Dis* 4:253-255, 1984

QOL of 458 renal patients treated by in-center hemodialysis, CAPD, or transplantation indicate more favorable adjustment for CAPD patients compared with HD patients. Patients with a successful transplant show the highest overall adjustment when compared with both groups of dialysis patients

Evans, Manninen et al: The quality of life of patients with end-stage renal disease. *N Engl J Med* 312:553-559, 1985

Confirms other studies; role of failed transplant

Age and QOL in Patients with ESRD

Functional status diminishes as age increases

Satisfaction with life and care often increase in general population as well as in patients with ESRD

Therefore we cannot use only functional QOL measures in our assessments of an aging ESRD population

Depression and QOL in Patients with CKD

Depression and depressive affect
associated with almost all QOL measures
in almost all studies

SF-36

KDQOL

Cognitive Component

Somatic Component

may be linked to functional status

Race and QOL

HEMO study

Multiple regression model assessed the extent to which race was associated with differences in health related QOL scores after adjustment for socio-demographic and clinical variables

African-Americans had higher Index of Well-Being and burden of kidney disease scores, but lower cognitive function scores (all $P < 0.05$)

For scales reflecting symptoms and effects of kidney disease, sleep quality, and the Physical Component Summary, the fall in HRQOL with increasing co-morbidity was significantly greater in non-African Americans.

No racial differences in scores of the Mental Component Summary, social support, dialysis staff encouragement, or patient satisfaction

Dialysis modality and QOL

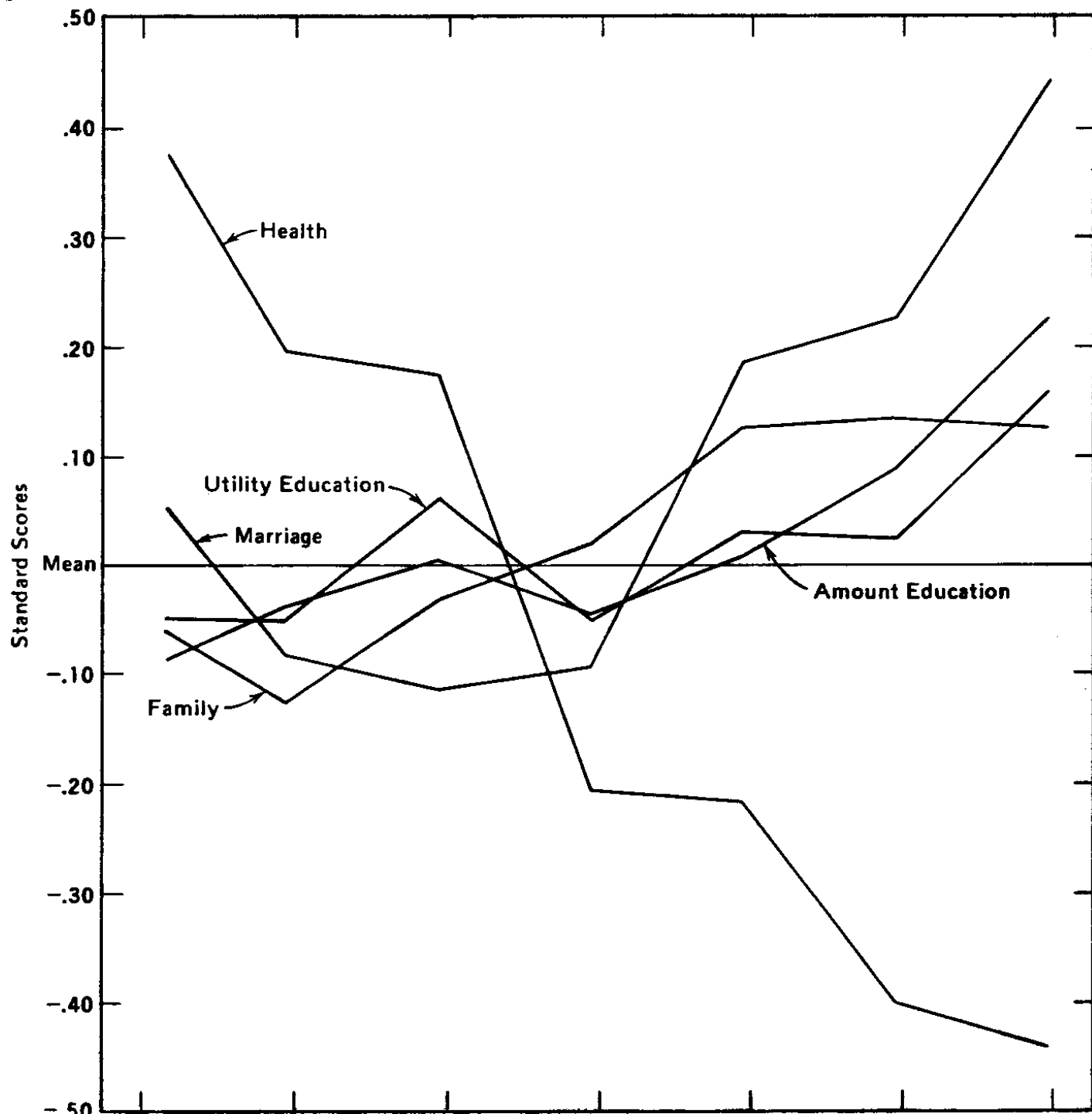
Comparison Transplant vs Dialysis

Many studies

Same conclusions

No comparison

Current interest -- type of immunosuppression and QOL



Age and QOL in ESRD Patients



Dialysis modality and QOL

Comparison PD vs. HD

Not many studies

Small number of subjects

Difficult to compare

Varying conclusions

Most patients are on HD in US –
focus on HD patients

DOPPS study

Health Related QOL worldwide

Dialysis Outcomes and Practice Patterns Study (DOPPS)

International, prospective, observational study of randomly selected HD patients in the United States (148 facilities), five European countries (101 facilities), and Japan (65 facilities).

17,236 patients.

Kidney Disease Quality of Life Short Form (KDQOL-SFTM)

Three components of HRQOL scored: (1) physical component summary (PCS), (2) mental component summary (MCS), and (3) kidney disease component summary (KDCS).

Complete responses on HRQOL measures were obtained from 10,030 patients. Cox models were used to assess associations between HRQOL and the risk of death and hospitalization, adjusted for multiple sociodemographic variables, comorbidities, and laboratory values.

Mapes DL, et al. Worldwide Dialysis Outcomes and Practice Patterns Study. Health-related quality of life among dialysis patients on three continents: the Dialysis Outcomes and Practice Patterns Study. *Kidney Int.*

2003;64:339-49

DOPPS study

Health Related QOL and Ethnicity in US

6,151 hemodialysis patients treated in 148 US dialysis facilities

Kidney Disease Quality of Life Short Form

Three components scored: Physical Component Summary (PCS), Mental Component Summary (MCS), and Kidney Disease Component Summary (KDCCS).

Patients were classified by ethnicity as Hispanic and five non-Hispanic categories: white, African American, Asian, Native American, and other.

DOPPS study

Health Related QOL and Ethnicity in US

Compared with whites, African Americans showed higher HRQOL scores for all three components (MCS, PCS, and KDCS).

Asians had higher adjusted PCS scores than whites, but MCS or KDCS scores did not differ between groups.

Compared with whites, Hispanic patients had significantly higher PCS scores and lower MCS and KDCS scores.

Native Americans had significantly lower adjusted MCS scores than whites.

The three major components of HRQOL were significantly associated with death and hospitalization for the entire pooled population, independent of ethnicity.

DOPPS study

Health Related QOL worldwide

For patients in the lowest PCS quintile, the adjusted RR of death was 93% higher (RR = 1.93, $P < 0.001$), and the risk of hospitalization was 56% higher (RR = 1.56, $P < .001$) than for patients in the highest quintile level.

Adjusted RR of mortality per 10-point lower HRQOL score were 1.13 for MCS, 1.25 for PCS, and 1.11 for KDCS.

The corresponding adjusted values for RR for first hospitalization were 1.06 for MCS, 1.15 for PCS, and 1.07 for KDCS. Each RR differed significantly from 1 ($P < 0.001$).

For 1 g/dL lower serum albumin concentration, the RR of death adjusted for PCS, MCS, and KDCS and the other covariates was 1.17 ($P < 0.01$).

Albumin was not significantly associated with hospitalization (RR = 1.03, $P > 0.5$).

HEMO study - Intensity of HD

At baseline and annually, subjects responded to both the Index of Well-Being and the KDQOL-Long Form questionnaires. Interventions assessed on the basis of their average effects over 3 years.

At baseline, the SF-36 physical component summary score was lower than in healthy populations, but the mental component score was nearly normal.

Over 3-year follow-up, physical health continued to decline; mental health and kidney disease-targeted scores remained relatively stable.

High dose intervention was associated with significantly less pain (4.49 points, $P < 0.001$) and higher physical component scores (1.23 points, $P = 0.007$), but these effects were small compared to the variability in scores.

High flux membranes were not associated with statistically significant differences in health-related quality of life.

Unruh M, Benz R, Greene T, Yan G, Beddhu S, DeVita M, Dwyer JT, Kimmel PL, Kusek JW, Martin A, Rehm- McGillicuddy J, Teehan BP, Meyer KB; The HEMO Study Group. Effects of hemodialysis dose and membrane flux on health-related quality of life in the

HEMO Study. *Kidney Int.* 2004 Jul;66(1):355-66.

Sleep as a QOL Indicator in the Hemodialysis Population

- Several studies show sleep complaints are prevalent in hemodialysis patients

*Holley et al., AJKD 19:156-161, 1992; Walker et al., AJKD 26:751-756, 1995
Kimmel et al., Nephron 40:407-410, 1985; Zoccali et al JASN 12:2854-2859, 2001*

- There is a high prevalence of sleep disturbance in hemodialysis patients

*Kimmel et al., AJM 86:308-314, 1989; Kimmel et al., Nephron 40:407-410, 1985
Hanly Sem Dial 17:109-114, 2004; Zoccali et al JASN 12:2854-2859, 2001*

- Only one study has shown poor sleep of HD patients is associated with lower health related QOL. It used the SF-36, which may be problematic, since it is not a classic psychosocial measure

Iliescu et al., Neprol. Dial. Transplant 18: 126-132, 2003

Pain as a QOL Indicator in the Hemodialysis Population

- Pain has been shown to affect QOL in a variety of medical conditions

Skevington, S; Pain 76:395-406, 1998

- 50% of a Canadian hemodialysis population reported disruption of life by pain

Davison, S; AJKD 42:1239-1247, 2003

- 21% of a US hemodialysis population reported pain as a troublesome symptom

Kimmel PL, et al; AJKD 42:713-721, 2003

- Perception of pain during and after hemodialysis and its association with QOL have not been well studied.

Spirituality as a QOL Component

- May function as coping mechanism**
- Differences between groups may be associated with differential outcome**
- Survival effects unlikely to be associated with medical/treatment parameters**
- Correlations suggest spirituality and religiosity factors may be QOL measures**

GW studies - Patient satisfaction with nephrologist

Correlations of satisfaction with nephrologist score with –

- IEQ scores ($r = -0.35$, $p = 0.01$)
- BDI scores ($r = -0.28$, $p = 0.04$)
- CDI scores ($r = -0.28$, $p = 0.04$)
- QLS scores ($r = 0.34$, $p = 0.01$)
- SWLS scores ($r = 0.41$, $p = 0.01$)

Causes of Pain Related to CKD

- Bone pain from renal osteodystrophy
- Peripheral neuropathy
- Beta 2 microglobulin Amyloidosis
- Carpal Tunnel syndrome
- Dialysis related arthropathy
- Calciphylaxis
- Renal cyst hemorrhage/ rupture (Acquired and Autosomal dominant PKD)
- Renal Colic
- General medical

Causes of Pain Related to Renal Replacement Therapy

- Surgery for vascular or peritoneal access
- Needle insertion in hemodialysis
- Dialysate instillation in peritoneal dialysis
- Dialysis disequilibrium syndrome / Dialysis headache
- Muscle cramping during or after hemodialysis
- Cardiac or intestinal ischemia from hemodynamic changes of renal replacement therapy
- Subcutaneous injection of recombinant human erythropoietin
- Vascular steal syndrome
- Peritonitis in patients treated with peritoneal dialysis

Demographic and Clinical Characteristics

N = 128

- Race
 - African-American 91.4%
 - White 7.8%
 - Asian 0.8%
- Male (p=0.036) 59.4%
- Mean Age, years (p=0.0017) 57.3 (13.8)
- Diabetes 48.4%
- Mean Karnofsky 74.6 (14.6)
- Mean duration on dialysis (months) (p=0.0005) 39.9 \pm 40.9
- Mean serum albumin concentration (g/dl) 3.8 \pm 0.4
- Mean Hemoglobin concentration (g/dl) 11.6 \pm 1.6
- Mean Kt/V 1.47 \pm 1

Psychosocial Measures

- Mean BDI (depression) 11 \pm 8.2
- Mean CDI (cognitive depression) 5.2 \pm 6
- Mean MSP (social support) 20.1 \pm 4.3
- Mean IEQ (burden of illness) 50.7 \pm 25.5
- Mean SWLS (life satisfaction) 21.2 \pm 8

Pain on Needle Insertion

- Degree of pain on needle insertion correlated with hemoglobin concentration ($r = 0.20$, $p = 0.022$), but with no other demographic or psychosocial variable

Pain During Dialysis

- 29.7% of patients experienced pain during dialysis other than needle insertion
- Of those patients, 44.7% experienced pain at the end of the treatment
- 79.4% of those patients experienced pain in the extremities

Pain during Dialysis

- There was no correlation of pattern, duration, frequency or intensity of pain during dialysis with age, presence of diabetes, functional status, albumin, hemoglobin, or Kt/V
- There was no correlation of these parameters of pain experience during dialysis and any of the QOL indicators, with the exception of
 - Presence of pain, its frequency and intensity and BDI, and presence and intensity of pain with CDI and IEQ

Experience of Pain on Non-Dialysis Days

- 44.1% of patients had pain on non-dialysis days
- In these patients, 66% reported no pattern regarding time of onset of pain
- 65.3% of patients experienced pain on non-dialysis days in the extremities
- There was no correlation of pattern, duration, frequency or intensity of pain on non-dialysis days with age, presence of diabetes, functional status, albumin, hemoglobin, or Kt/V

Characteristics of Pain on Non-dialysis Days

- Presence of pain on non-dialysis days correlated with BDI ($r=0.18$, $p=0.04$) and IEQ ($r=0.19$, $p=0.02$)
- Duration of pain on non-dialysis days correlated with time since initiating ESRD therapy ($r=0.20$, $p=0.023$)
- Frequency of pain on non-dialysis days correlated with BDI ($r=0.21$, $p=0.02$)

Degree of Pain on Non-dialysis Days

- Intensity of pain on non-dialysis days correlated with depression (BDI: $r=0.28$, $p=0.0015$, CDI: $r=0.18$, $p=0.04$) and IEQ ($r=0.30$, $p=0.0006$) and there was a trend with SWLS ($r=-0.17$, $p=0.054$)
- Frequency and intensity of pain on non-dialysis days were highly correlated ($r=0.90$, $p<0.0001$)
- Intensity of pain on non-dialysis days correlated with location, pattern, frequency and duration of pain, and previous history of similar pain before starting dialysis
- There were few associations of pain on non-dialysis days with patient demographic characteristics

Depression and Pain

- BDI correlated with pattern of pain on non-dialysis days ($r=0.24$, $p=0.006$)
 - As depression worsens pain is more constant
- BDI correlated with frequency of pain on non-dialysis days ($r=0.21$, $p=0.02$)
 - As depression worsens pain is more frequent
- BDI correlated with intensity of pain on non-dialysis days dialysis ($r=0.28$, $p=0.0015$)
 - As depression worsens pain is more intense

HD Patients Perception of Pain Intensity

	<u>All Patients</u>	<u>Patients with Pain</u>
• Mean Pain Needle Insertion	3.2 \pm 3.3	5.4 \pm 2.6
• Mean Pain during HD	2.2 \pm 3.5	6.9 \pm 2.3
• Mean Pain non-dialysis days	3.2 \pm 3.8	7.0 \pm 2.3

Pain and QOL in ESRD Patients

Pain, especially on non-dialysis days, negatively affects patients' perceptions of QOL

Subjective Assessment of Sleep in HD Patients

- 45.6% of patients had evidence of a sleep disturbance
- Perception of global sleep quality, subjective sleep quality, sleep efficiency and daytime sleep dysfunction all highly correlated with the single question QOL score ($p < 0.001$).

Subjective Assessment of Sleep in HD Patients

- Subjective sleep quality correlated with albumin, BDI, CDI, IEQ, SWLS, presence and intensity of pain on non-dialysis days, and presence, duration, frequency and intensity of pain during dialysis
- but not with demographic characteristics, or levels of hemoglobin, or Kt/V.

Subjective Assessment of Sleep in HD Patients

- Perception of global sleep quality, subjective sleep quality, sleep efficiency, sleep disturbance and daytime sleep dysfunction strongly correlated with Satisfaction with Life Scores, Illness Effects Questionnaire Scores, BDI and CDI scores, and perception of social support,
- but not with levels of hemoglobin or Kt/V.

Pain and Sleep as Mediators of QOL

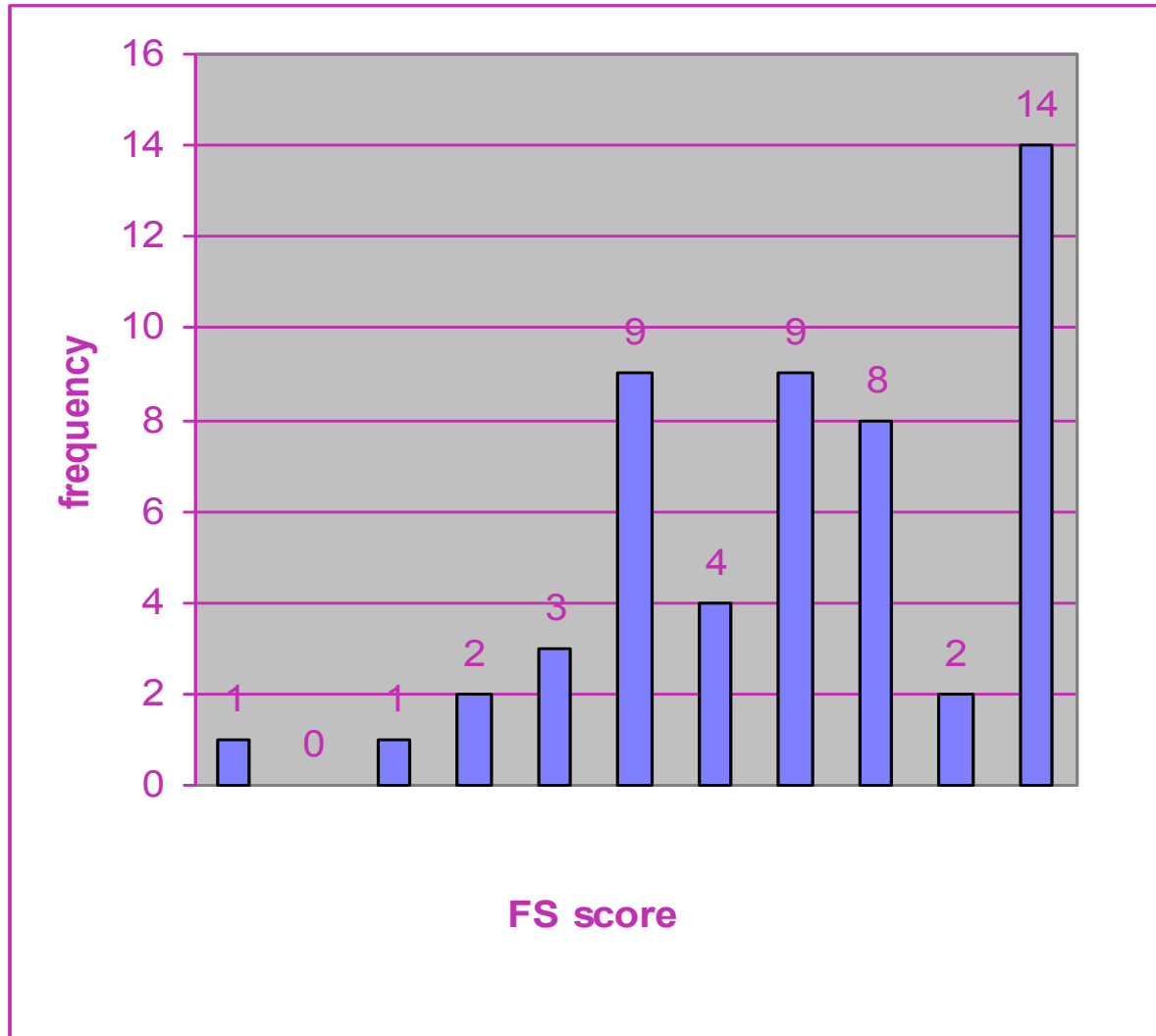
- HD patients' perception of pain and sleep disturbances are not associated with demographic or treatment variables
- Perception of pain during HD is episodic, variable and dissociated from patients' perceptions of their global QOL
- Perception of pain on non-dialysis days is consistent and linked to patients' perceptions of their global QOL
- HD patients' perception of poor sleep is tightly linked to poorer QOL, defined by many measures, as well as their perception of pain

Single Question QLS

- Mean QLS was 7.1 ± 2.5
- Modal QLS was 10
- Median QLS was 7

- 86.8% of patients scored more than 5.

Frequency of QOL score

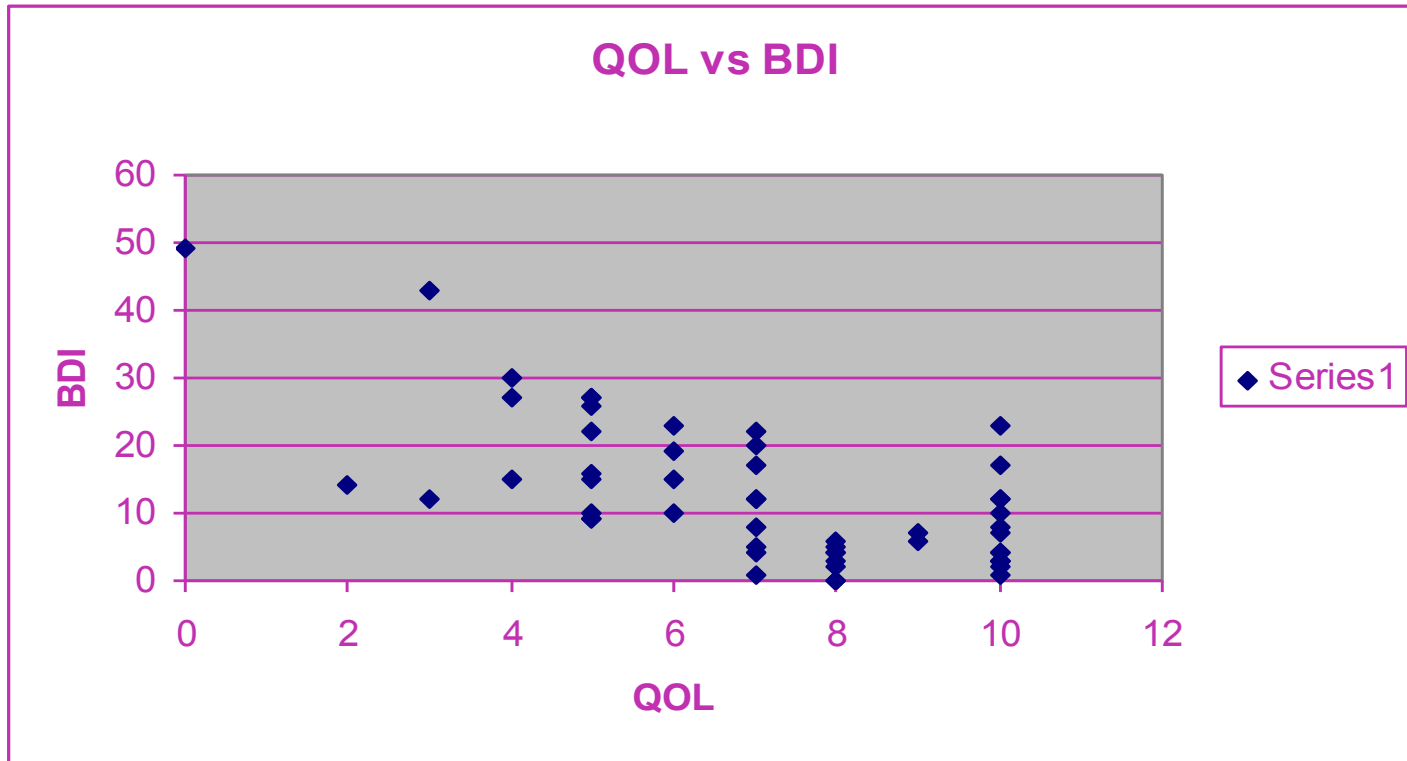


Validation of Single Question QOL score

Correlations of QLS with –

- IEQ scores ($r = -0.56$, $p = <0.001$)
- BDI scores ($r = -0.66$, $p = <0.001$)
- CDI scores ($r = -0.68$, $p = <0.001$)
- MSP scores ($r = 0.54$, $p = <0.001$)
- Satisfaction with their nephrologist ($r=0.34$, $p=0.01$)

QOL vs BDI



QOL and Spirituality

Questions -- Existential Assessments and Religious Beliefs

Existential questions

1. I have felt physically terrible/well
2. My life is worthless/worthwhile
3. My life is meaningless/meaningful

Questions regarding religious beliefs

4. For me, faith or spiritual belief is: not important/very important
5. For me, in adjusting to my kidney disease, faith or belief is: not helpful/very helpful
6. For me, attending religious services is: not worthwhile/very worthwhile
7. For me, in adjusting to kidney failure, attending religious services is: not worthwhile/very worthwhile

scale ranges from 0, signifying very bad, to 10, signifying excellent.

QOL and Spirituality

53 patients enrolled. 87% were African-American.

Men had higher depression scores, perceived lower social support, and had higher religious involvement scores than women. No other parameters differed between genders.

Perception of spirituality and religiosity did not correlate with age, Karnofsky score, dialysis dose, or hemoglobin or albumin level.

Greater perception of spirituality and religiosity correlated with increased perception of social support and QOL, and less negative perception of illness effects and lower levels of depressive affect.

Interventions and QOL

Transplantation

Erythropoietin

Dialysis modality?

Intensity of therapy? Daily hemodialysis?

Exercise

Symptom management

Treatment of Depression

Treatment of Sleep Disturbance/Sleep Apnea

Pain management

Treatment of Erectile Dysfunction

Improve Patient Satisfaction

Summary

1. Proper measures for assessing QOL in CKD patients unclear
2. Subjective/Objective, Function/Satisfaction, Generic/Disease-specific
3. Treatment with transplantation and erythropoietin
4. SF-36/KDQOL measures predict survival
5. Ethnic/International differences -- Implications?
6. Studies necessary in early stages of CKD
7. Studies necessary in children
8. Usefulness of psychosocial measures and single question QOL measure
9. Pain, sleep and symptoms
10. The time for intervention is here!

Calidad de vida en enfermedades de los rinones

- **Muchas gracias por la invitacion a este lugar hermoso**
- **y a esta conferencia excelente**
- **Y por su indulgencia con mi charla en ingles**
- **Hay algunas preguntas?**

QOL in CKD

OUTLINE

Concepts, Domains, and Measures

Review of Correlates of QOL

Review of recent large studies

QOL in Renal Disease

- **David Reiss, M.D.**
- **Rolf Peterson, Ph.D.**
- **Karen Weihs, M.D.**
- **Samuel J. Simmens, Ph.D.**
- **Samir Patel, M.D.**
- **Howard University Medical Center**
- **Washington VA Medical Center**
- **Woody Moss, M.D.**
- **Mae Thamer, Ph.D.**
- **Archana Shyamsunder, M.B.B.S.**
- **Viral Shah, M.B.B.S.**
- **Prashant Khetpal, M.B.B.S.**



Recruitment

- 156 patients approached
- 6 non-English speakers
- 4 patients acutely medically ill
- 18 declined
- Recruitment rate 87.7%

Results

- Data were available from 128 hemodialysis patients
- 91.4% were AA
- 40.6% were women
- Average duration of treatment was 39.9+/- 40.9 months

Pain on Needle Insertion

- 24.2% (31/128) of the patients had a catheter for access
- Of the patients with grafts or fistulae (76%)
 - 78.4% complained of pain on needle insertion
 - This pain was experienced primarily (86.7%) during the needle insertion, rather than during treatment
- There was no difference between diabetics and non-diabetics

Subjective Assessment of Sleep in HD Patients

- Perception of global sleep quality, subjective sleep quality, sleep efficiency, sleep disturbance and daytime sleep dysfunction strongly correlated with perception of pain and its intensity during dialysis and on non-dialysis days

Single Question QOL score

ESRD patients' QOL measured by a single question correlates with their perception of –

- Depression
- Social support
- Illness effects
- Satisfaction with life
- Satisfaction with nephrologist

QOL and Spirituality

ESRD patients treated with HD at the Gambro-GWUMC N St unit recruited 9-1-01 to 11-8-01.

Psychosocial and medical variables collected included Perception of importance of faith (spirituality), Attendance at religious services (religious involvement), Beck Depression Inventory, Illness Effects Questionnaire, Multidimensional Scale of Perceived Social Support, McGill QOL Questionnaire scores, and Karnofsky scores, dialysis dose, pre-HD Hb and SA1b levels.

Interventions and QOL

Transplantation

Erythropoietin

Dialysis modality?

Intensity of therapy? Daily hemodialysis?

Exercise

Symptom management

Treatment of Depression

Am J Kidney Dis. 2004 Jan;43(1):90-102. Early clinical, quality-of-life, and biochemical changes of "daily hemodialysis" (6 dialyses per week). Williams AW, Chebrolu SB, Ing TS, Ting G, Blagg CR, Twardowski ZJ, Woredekal Y, Delano B, Gandhi VC, Kjellstrand CM; Daily Hemodialysis Study Group.

Interventions to Improve QOL

Not much out there...

- Correction of anemia

- Treatment of disordered sleep, pain, sexual dysfunction, depression and marital dysfunction

- Exercise

- Provision of Social Support

- Attention to issues pertaining to spirituality/beliefs

- Vocational/occupational rehabilitation

Summary

- A majority of patients had pain on needle insertion, almost a third of patients had pain during dialysis, and nearly half of patients had pain on non-dialysis days
- Almost half of patients had complaints of disturbed sleep
- Patients' perceptions of pain on non-dialysis days were tightly linked to their assessment of QOL, while relationships of pain during needle insertion and dialysis to QOL parameters were more tenuous
- Patients' perceptions of poor sleep were tightly linked to their assessments of QOL and perception of pain

Summary

- A majority of patients had pain on needle insertion, almost a third of patients had pain during dialysis, and nearly half of patients had pain on non-dialysis days
- Almost half of patients had complaints of disturbed sleep
- Patients' perceptions of pain on non-dialysis days were tightly linked to their assessment of QOL, while relationships of pain during needle insertion and dialysis to QOL parameters were more tenuous
- Patients' perceptions of poor sleep were tightly linked to their assessments of QOL and perception of pain

Conclusions - II

- Interventions directed toward treating depression and other dysfunctional aspects of the psychosocial milieu are warranted and may improve HD patients' experience of pain and sleep disturbances
- Interventions directed toward treating pain on non-dialysis days and sleep disorders are warranted and may improve HD patients' perceptions of their QOL

Successes of US ESRD Program

Growth

Insurance coverage

Extension to minority populations

Improvement in mortality?

Burden of ESRD treated with Dialysis

Physical

Sexual dysfunction, pain, disordered sleep, restless legs, fatigue, pruritus, side effects of medications

Psychological

Dependence on machine, shortened life expectancy, reduced fertility, potential for intimacy

Social

Time spent on dialysis, loss of work, financial burden, diet, medication burden, altered relationships with family/friends/spouse

Coping with Demands of ESRD treated with Dialysis

Role Issues

Treatment Demands

Waiting for Transplant

Coping with Demands of ESRD treated with Dialysis

Full employment

Full family Function, vs

Disability

Family Dysfunction

Depression

Anxiety

Loss of Role/Identity

Alcohol/Substance Abuse

Domains of QOL

PHYSICAL

Physical functioning, work capacity

PSYCHOLOGICAL

General affect (mood) – anxiety, depression

Perception of well-being (illness effects)

Life Satisfaction

SOCIAL

Occupational rehabilitation, pastimes,
familial and social interaction

Evaluation of QOL

Translating various aspects and components of QOL into quantitative values is a complex task - multiple dimensions need to be evaluated, with a multi-item assessment of each dimension

Fundamental questions for QOL measures:

1. Does the way a person feels about him- or herself, family, friends, or the way the illness affects him or her, have an impact on the outcomes of patients with chronic medical illness?
2. Does the manner in which a person reacts to the illness within the medical community have an impact upon the outcome in patients with chronic medical illness?

Types of QOL Measures

Many different measures have been used:

Objective vs. Subjective

Function-based versus Satisfaction-based

Disease-based vs. Non specific (general)

QOL categories : domains and measures

<u>Domain</u>	<u>Measure</u>	<u>Satisfaction/function</u>
Global satisfaction	SWLS	S
Global perception of illness	IEQ	S/F
Functional capacity	Karnofsky	F
Affective functioning	BDI/CDI	F
Social environment functioning	PAS	S/F
Employment	PAV	F
Sexuality	PAR	F
Marital satisfaction	DAS	S
Perceived social support	MSPSS	S
Spirituality		S/F

SWLS, Satisfaction with Life scale, IEQ, Illness Effects Questionnaire; Karn, Karnofsky score; BDI, Becks Depression Inventory; CDI, Cognitive Depression Index; PAS, Psychological Adjustment to Illness Scale-Social; PAV, Psychological Adjustment to Illness Scale- Vocational; Psychological Adjustment to Illness Scale-Relationships; DAS, Dyadic Adjustment Scale; MSPSS, Multidimensional Scale of Perceived Social Support

Domains of Quality of Life

Functioning

Well-being

Quality of Life - Measurement Concepts

- **Subjective vs objective**
- **Functional**
- **Satisfaction**

- **General Population**
- **Chronic Illness population Health-related QOL (HRQOL)**

- **Generic**
- **Disease-based**

Quality of Life - Domains

- **Physical functioning**
- **Mental health**
 - **General affect (mood)**
 - **Perception of well-being (illness effects or burden of illness)**
 - **Life satisfaction (happiness)**
- **Social relationships**
- **Patient satisfaction**

Measures

- Patient Satisfaction
- DiMatteo and Hays
- Modification -- satisfaction with nephrologist vs satisfaction with staff
- Satisfaction with nephrologist correlates with behavioral compliance and Salb

Measures

- KDAQOL -- Based on SF-36 -- generic, subjective
 - PCS/MCS
- Kidney-specific domains
 - symptoms/problems
 - Effects of KD on daily life
 - Burden of KD
 - Cognitive function
 - Work status
 - Sexual function
 - Quality of social interaction
 - Sleep
 - Social Support
 - Dialysis staff encouragement
 - Patient satisfaction

Depression

- **WHO estimates -- Worldwide**
- **2nd most common debilitating illness**
- **Worsened by medical comorbidity**
- **Lack of controlled or longitudinal studies**

Depression in ESRD Patients

- **Losses**
 - **Renal Function**
 - **Physical Function**
 - **Role**
 - **Cognitive Abilities**
 - **Sexual Function**
-
- **Symptoms of Medical Illness**

Depression in ESRD Patients

- **Most common psychiatric**
- **disorder in patients with ESRD**

•

•

Depression in ESRD Patients

- **Estimates of prevalence of depression in ESRD patients in various studies range from 0-100%**
- **Prevalence varies with assessment tool**
-
-
-
-

Depression in ESRD Patients

- **Lowery and Atcherson 1980 18%**
 - **APA dx; white patients, Iowa**
- **Hinrichsen et al 1989 17.7%**
 - **Prevalent HD patients with minor depressive disorder**
 - **6.5% Major Depression – Schedule for Affective Disorders and Schizophrenia**

Table 1. Demographics of hemodialysis sample

Site	<i>N</i>	Male	Female	White	African American	Hispanic	Other
GWU	93	58	35	11	77	2	3
HUH	111	61	50	3	106	1	1
VAMC	91	90	3	5	83	1	2
Total	295	209	88	19	266	4	6

Abbreviations are in the Appendix.

Table 2. Clinical medical and psychosocial characteristics of the study population ($N = 295$)

	Mean	SD	Range
Age, years	54.6	14.13	19–84
Diabetes, %	42.3	—	—
Albumin, g/dl	3.82	0.49	2.0–5.7
Kt/V	1.2	0.4	0.36–1.96
PCR, g/kg/day	1.06	0.27	0.49–2.37
MAC, cm	30.2	5.9	15.9–55.7
BDI	11.4	8.1	0–47
MSP	22.1	4.5	5.7–28
IEQ	64.4	26.3	6–140
SWLS	21.7	7.9	5–35
Time compliance %	97.8	2.9	83.3–100
Attendance %	98.3	6.1	38.8–100
Total time compliance %	95.9	7.0	36.4–100

Abbreviations are: PCR, protein catabolic rate; MAC, mean arm circumference; BDI, Beck Depression Inventory; MSP, Multidimensional Scale of Perceived Social Support; SWLS, Satisfaction with Life Scale; Time compliance, shortening behavior; Attendance, skipping behavior; Total time compliance, integrated shortening and skipping behavior.

Table 5. Predicting mortality from compliance indicators and psychosocial factors

Risk factors	Adjusted RR (95% C.I.)	<i>P</i>
% Time compliance	0.76 (0.62, 0.91)	<0.0001
% Attendance	0.87 (0.72, 1.05)	0.15
% Total time compliance	0.79 (0.66, 0.95)	0.01
Beck Depression Inventory	1.05 (0.87, 1.27)	0.59
Cognitive Depression Index	1.03 (0.85, 1.26)	0.73
Illness Effects Questionnaire	1.23 (1.00, 1.51)	0.05
Social Support (MSP)	0.80 (0.65, 0.98)	0.03
Satisfaction with Life Scale	0.83 (0.66, 1.04)	0.10

Abbreviations are: RR, Risk Ratio; C.I., Confidence Interval. All variables are standardized to a standard deviation of 1.0, so that the RR represents the expected change in mortality risk associated with a one standard deviation change in the risk factor. All relative risks are controlled for variations in patients' age, severity coefficient, serum albumin concentration, and dialyzer type. Details are in the text.

Table 2. Depressive affect as a predictor of mortality in ESRD patients treated with hemodialysis

	RR (CI)	<i>P</i> value
Baseline Beck Depression	1.09 (0.92, 1.29)	NS
Baseline Cognitive Depression	1.09 (0.91, 1.31)	NS
Time-varying Beck Depression	1.24 (1.05, 1.46)	0.01
Time-varying Cognitive Depression	1.18 (1.00, 1.38)	0.05
Adjusted Time-varying Beck Depression	1.32 (1.13, 1.55)	0.0006
Adjusted Time-varying Cognitive Depression	1.23 (1.05, 1.43)	0.009

Data are adjusted and unadjusted for age, severity, serum albumin concentration, dialyzer type, and site. All relative risks have been standardized to a standard deviation of 1.0 (based on the SD's of the 295 patients). Analyses for Time-varying Beck and Cognitive Depression scores are univariate. All adjusted analyses are controlled for age, severity, serum albumin concentration, dialyzer type and site. CI is confidence interval.

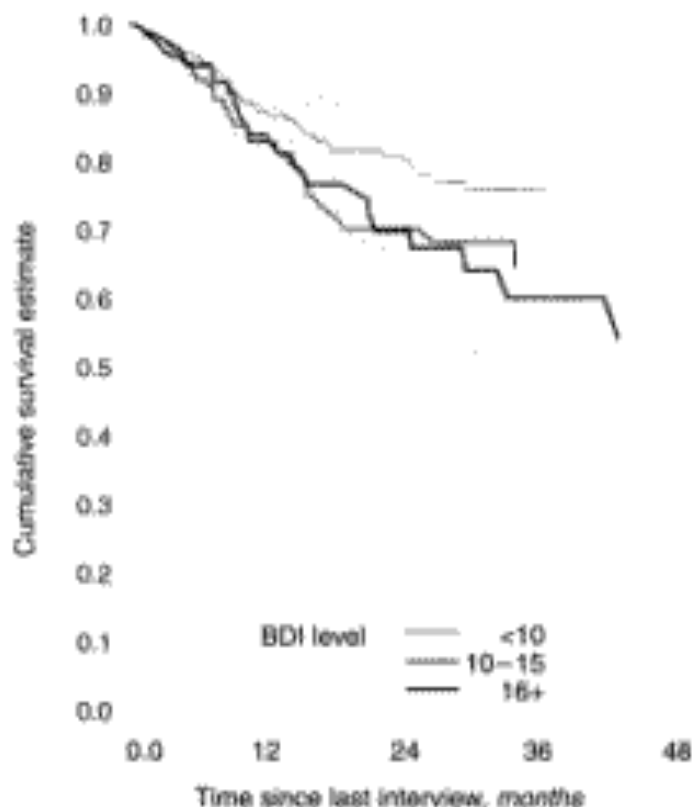


Fig. 1. Association between the level of depressive affect and survival in 295 patients with end-stage renal disease treated with hemodialysis followed and assessed longitudinally. Cumulative survival estimates were plotted against time for three levels of depression: BDI levels less than 10 (low or nonexistent symptoms, thin line), 10 to 15 (mild levels, medium line), and 16 or greater (moderate to severe levels, broad line). For the time-varying proportional hazards modeling, each patient contributed a separate observation spanning the time from each BDI assessment until the next assessment or death or the end of the study. The cumulative survival estimates plotted are based on the same pooling of observation periods. Patients with depression had greater mortality risk than patients without symptoms of depressive affect, although there was no difference in risk between patients with mild or more severe symptom levels.

Table 4. Correlation coefficients of patient characteristics and dyadic adjustment indices in men and women ESRD patients treated with hemodialysis functioning in dyadic relationships^a

Factors	DAS Satisfaction Subscale		DAS Negativity	
	Men (<i>r</i>)	Women (<i>r</i>)	Men (<i>r</i>)	Women (<i>r</i>)
Treatment risk				
age	0.05	-0.07	-0.21 ^b	-0.03
severity	0.03	-0.03	-0.15	-0.07
albumin	-0.01	-0.009	0.03	0.05
Kt/V	0.03	0.26	0.04	-0.38 ^b
% attendance	-0.09	0.32 ^{b,c}	0.03	-0.38 ^b
Psychosocial				
IEQ	-0.14	-0.54 ^{c,d}	0.14	0.53 ^{c,d}
BDI	-0.18 ^b	-0.47 ^c	0.23 ^b	0.42 ^f
CDI	-0.18 ^b	-0.48 ^c	0.22 ^b	0.38 ^g
MSP	0.32 ^e	0.64 ^e	-0.19	-0.64 ^d
Neuroimmunologic				
IL-1	-0.02	-0.25	-0.03	0.22
β -endorphin	-0.08	-0.36 ^b	0.05	0.34 ^g

^a % attendance, skipping behavior. Other abbreviations as in Tables 1 and 3.

^b $P < 0.05$.

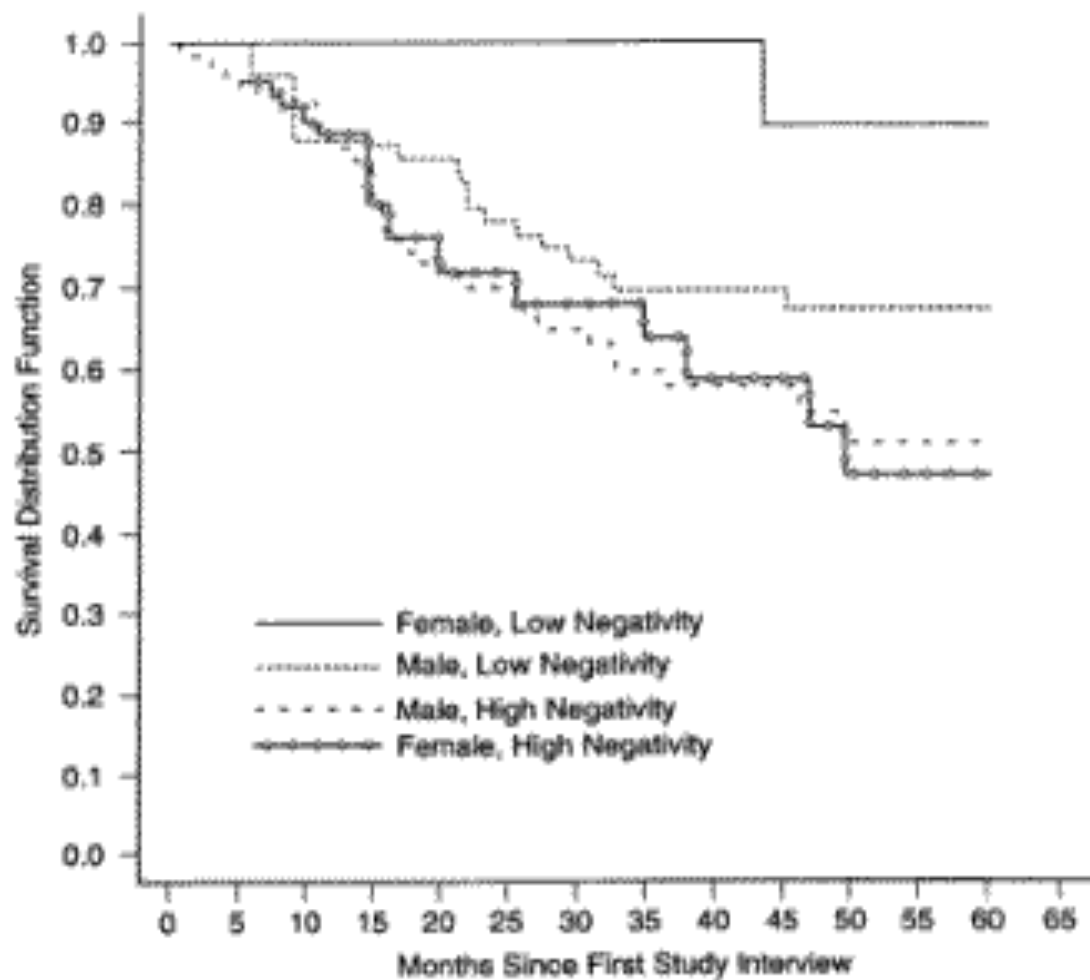
^c Fisher Z Prime Test ($P < 0.05$), testing differences between correlations in men and women

^d $P < 0.001$.

^e $P = 0.002$.

^f $P < 0.01$.

^g $P < 0.01$.



Other Psychosocial Variables -- Faith

**Perception of spirituality and
religiosity**

**Correlate with important
parameters such as**

Extent of Depressive Affect

Perception of Burden of Illness

Social Support

Perception of QOL

Other Psychosocial Variables -- Faith

**Perception of spirituality and
religiosity**

**No correlation with
meaningful medical/treatment
parameters such as**

Age

Karnofsky score

Kt/V, Hb, SAlb

Other Psychosocial Variables -- Faith

**May function as coping
mechanism**

**Differences between groups
may be associated with
differential outcome**

**Survival effects unlikely to be
associated with medical/
treatment parameters**

FS and Pain

- Pain
 - No correlation of pain associated with needle insertion and FS
 - No correlation of frequency, degree and duration of pain during dialysis and FS
 - No correlation of frequency, degree and duration of pain during dialysis and FS

Pain on Non-dialysis Days

- Pain on non-dialysis days correlated with BDI ($r=0.18$, $p=0.04$)
- Duration of pain on non-dialysis days correlated with time since initiating ESRD therapy ($r=0.20$, $p=0.023$)
- Degree of pain on non-dialysis days correlated with time since initiating dialysis ($r=0.28$, $p=0.015$), depression (BDI: $r=0.28$, $p=0.0015$; CDI: $r=0.18$, $p=0.04$), IEQ ($r=0.30$, $p=0.0006$), and there was a trend with SWLS ($r=-0.17$, $p=0.054$)

- Frequency of pain outside of dialysis correlated with BDI ($r=0.21$, $p=0.02$)
- presence of pain **during dialysis** correlated with BDI ($r = .25$, 0.0037)
CDI ($r = .23$, $p = 0.01$) IEQ ($r = .31$, $p = 0.0004$)

Pain on Non-dialysis Days

- Pain on non-dialysis days correlated with BDI ($r=0.18$, $p=0.04$)
- Duration of pain outside of dialysis correlated with time since initiating ESRD therapy ($r=0.20$, $p=0.023$)
- Degree of pain outside of dialysis correlated with time since initiating dialysis ($r=0.28$, $p=0.015$)
- Degree of pain outside of dialysis correlated with BDI ($r=0.28$, $p=0.0015$) and CDI ($r=0.18$, $p=0.04$)
- Degree of pain outside of dialysis correlated with IEQ ($r=0.30$, $p=0.0006$), SWLS ($r=-0.17$,

- Duration of pain on non-dialysis days correlated with time since starting ESRD therapy ($r=0.20$, $p=0.023$)
- Frequency of pain outside dialysis correlates with time since starting ESRD therapy ($r=0.17$, $p=0.054$)

- If they had some pain before the start of HD it is quite likely it continued

- Presence of pain on non-dialysis days was correlated with onset, location, pattern, duration and frequency of pain on non-dialysis and not associated with age, presence of diabetes, functional status, albumin, hemoglobin or Kt/V.

- The degree of pain on non-dialysis days correlated with the duration of pain outside dialysis ($r=.026$, $p=0.004$) and frequency of pain outside of dialysis ($r=0.9$, $p<0.001$)

- Presence of pain on non- dialysis days, onset, location, pattern, duration and frequency of pain on non-dialysis were highly intercorrelated.

Pain

- Pain during needle insertion
 - no difference between diabetics and non-diabetics

Sleep

- 45.6% had PSQI ≥ 5
- 54.4% had PSQI < 5

Results

Demographics

- N = 53
- 87% African American
- 9% White
- 4% Asian
- 58.5% Male
- Mean age 54.4 ± 13.7 years

Results of correlations - 2

- No correlation was found between QLS scores and patients' age, Karnofsky score, level of albumin, hemoglobin or Kt/V, or their satisfaction with dialysis nursing and technical staff.

Results of correlations - 2

- No statistically significant correlation was found between patient satisfaction with nephrologist and MSP scores and patients' age, Karnofsky score, level of albumin, hemoglobin or Kt/V.

Results of correlations - 3

- Patient satisfaction with dialysis staff did not correlate with QLS, BDI, CDI, IEQ, MSP, age, Karnofsky score, behavioral compliance measures, predialytic albumin, Kt/V or hemoglobin.
- Patient satisfaction with dialysis staff correlated with SWLS ($r = 0.37$, $p = 0.01$)

Summary

ESRD patients' satisfaction with nephrologist correlates with their perception of –

- Depression
- Social support
- Illness effects
- Satisfaction with life
- Quality of life

Conclusions - 1

- QLS is –
- a quick tool to measure subjective QOL
- as effective in eliciting information as lengthy questionnaires
- correlated with magnitude of depressive affect

Conclusions - 2

- HD patients' perception of satisfaction with the nephrologist plays a crucial role in patients' perception of QOL and depression – both related to mortality in ESRD patients.
- Improving HD patients' perception of satisfaction with the nephrologist therefore might increase quality and length of life.

Methods 2

- Illness Effects Questionnaire (IEQ) to assess perception of illness effects.
- Satisfaction With Life Scale (SWLS) to assess satisfaction with life.
- Multidimensional Scale of Perceived Social Support (MSP) to assess extent of perception of social support.

Satisfaction with nephrologist and dialysis staff in end stage renal disease patients

Viral Shah MD, Samir Patel MD,

Rolf Peterson PhD, Paul Kimmel MD

Departments of Medicine and Psychology

George Washington University, Washington DC

Methods 5

- Functional status assessed by Nurse Practitioner using Karnofsky Score
- Treatment and Nutritional parameters were Kt/V, predialytic hemoglobin and albumin levels.
- Behavioral compliance measures included shortening behavior, skipping behavior and total integrated time compliance.

Measures

- KDQOL -- 134 items
 - short form 79 items
- Widely used in ESRD studies
- Changes in HEMO study?
- Little emphasis on patient satisfaction, social support. depression

QOL measures and outcomes

A large number of trials throughout the world that study different aspects of treatment of renal failure include periodic assessments of QOL as one of the basic parameters to be considered on evaluating outcomes.

Age, functional status, presence of diabetes and other comorbidities predict hospitalization and survival – but subjective measures (perception of overall QOL, Satisfaction with Life) often do not correlate well with these parameters

Do the measures matter?

Pain in Hemodialysis Patients

McGill Pain Questionnaire in 53 hemodialysis and 27 transplant patients.

More than 80% of HD patients admitted to pain on dialysis from muscle cramps (16% described as significant)

60% admitted to pain on dialysis from headaches (18% described as significant)

Self-reported depression was correlated positively with pain

Pain in Hemodialysis Patients

Prospective cohort study of 205 Canadian hemodialysis (HD) patients
prevalence, cause, severity, and management

Questionnaire incorporated the Brief Pain Inventory, followed by the McGill Pain Questionnaire

103 patients (50%) reported a problem with pain

18.4% of patients had more than a single cause of their pain

Musculoskeletal pain was most common (50.5%) and equal in severity to pain associated with peripheral neuropathy and peripheral vascular disease.

BPI showed that 82.5% of patients experienced moderate or severe pain in the previous 24 hours, and 55.4% experienced moderate or severe pain at the time of the interview

Sleep as a QOL Indicator in the CKD Population

- The occurrence of restless sleep correlated significantly with increased illness intrusiveness in a study of 101 patients with ESRD.
Devins GM, et al, J Psychosom Res 37:163, 1993
- Sleep disturbances were associated with depressive symptoms, levels of pain and physical functioning by multivariate analysis of HD patients.
Williams SW, Am J Nephrol 22:18, 2002
- Poor sleep (PSQI >5) in CKD patients not yet on dialysis was associated with lower health related QOL by SF-36. *Iliescu et al, Neprol. Dial. Transplant 18:126, 2003*

Pain as a QOL Indicator in the Hemodialysis Population

- Pain has been shown to affect QOL in a variety of medical conditions

Skevington, S; Pain 76:395-406, 1998

- Pain may be an important determinant of QOL in the HD population

Devins GM et al; Pain 42:279-285, 1990 and Binik YM, et al. Kidney Int. 1982 Jun;21(6):840-8

- 21% of a US hemodialysis population reported pain as a troublesome

symptom Symptoms, especially pain, along with psychosocial and spiritual factors, are important determinants of QOL of patients with ESRD *Kimmel PL, et al; Am J Kidney Dis*

42:713-721, 2003

Sleep Complaints

Patients with ESRD

22 patients on maintenance hemodialysis investigated for sleep disturbances by questionnaire

14 patients reported sleep disturbances was characterized by:

- diminished sleep efficiency (time asleep/time in bed)
- more fragmented sleep

Time of lying in bed awake was perceived as particularly disturbing

Study Objectives

- To study the association of perception of sleep disturbance and pain with QOL indicators such as depression and perception of burden of illness in hemodialysis patients

Measures - Sleep and Pain

- **Sleep**

- Pittsburgh Sleep Questionnaire (PSQ)
- Previously used in ESRD population

- **Pain**

- Questionnaire we modified, using the Brief Pain Inventory and the McGill Pain Questionnaire
- Assessed twice (test-retest)
- Included questions regarding nature, location, frequency, intensity and duration of pain
 - during needle insertion,
 - during dialysis,
 - and off dialysis and on non-dialysis days (non-dialysis days)

Pain on Needle Insertion

- Of the patients with grafts or fistulae 97/128 (76%)
 - 78.4% complained of pain on needle insertion
 - This pain was experienced primarily (86.7%) during the needle insertion, rather than during treatment
- There was no difference between diabetics and non-diabetics
- Degree of pain on needle insertion correlated with hemoglobin concentration ($r = 0.20$, $p = 0.022$), but with no other demographic or psychosocial variable

Demographic and Clinical Characteristics

N = 128

- Race

- African-American 91.4%
- White 7.8%
- Asian 0.8%

- Male 59.4%

- Mean Age, years
57.3 ± 13.8

- Diabetes 48.4%

- Mean Karnofsky
74.6 ± 14.6

- Mean Duration on Dialysis (months)
39.9 ± 12.6

Psychosocial Measures

- Mean BDI (depression) 11 ± 8.2
- Mean CDI (cognitive depression) 5.2 ± 6
- Mean MSP (social support) 20.1 ± 4.3
- Mean IEQ (burden of illness) 50.7 ± 25.5
- Mean SWLS (life satisfaction) 21.2 ± 8

Pain During Dialysis

- 29.7% of patients experienced pain during dialysis other than needle insertion
- Of those patients, 44.7% experienced pain at the end of the treatment
- 79.4% of those patients experienced pain in the extremities

Pain during Dialysis - QOL

- There was no correlation of pattern, duration, frequency or intensity of pain during dialysis with age, presence of diabetes, functional status, albumin, hemoglobin, or Kt/V
- There was no correlation of these parameters of pain experience during dialysis and any of the QOL indicators, with the exception of
 - Presence of pain, its frequency and intensity and BDI, and presence and intensity of pain with CDI and IEQ

Depression and Pain

- BDI correlated with pattern of pain on non-dialysis days ($r=0.24$, $p=0.006$)
 - **As depression worsens pain is more constant**
- BDI correlated with frequency of pain on non-dialysis days ($r=0.21$, $p=0.02$)
 - **As depression worsens pain is more frequent**
- BDI correlated with intensity of pain on non-dialysis days dialysis ($r=0.28$, $p=0.0015$)
 - **As depression worsens pain is more intense**

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Pain Intensity

with Pain

	<u>All Patients</u>	<u>Patients</u>
• Mean Pain Needle Insertion 2.6	3.2 \pm 3.3	5.4 \pm
• Mean Pain during HD	2.2 \pm 3.5	6.9 \pm 2.3
• Mean Pain non-dialysis days	3.2 \pm 3.8	7.0 \pm 2.3

Psychosocial Measures

- Mean BDI (depression) 11 ± 8.2
- Mean CDI (cognitive depression) 5.2 ± 6
- Mean MSP (social support) 20.1 ± 4.3
- Mean IEQ (burden of illness) 50.7 ± 25.5
- Mean SWLS (life satisfaction) 21.2 ± 8

Subjective Assessment of Sleep in HD Patients

- 45.6% of patients had evidence of a sleep disturbance (PSQI > 5).
- Perception of global sleep quality, subjective sleep quality, sleep efficiency and daytime sleep dysfunction all highly correlated with the single question QOL score (FS) ($p < 0.001$).

Pain as a QOL Indicator in the Hemodialysis Population

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Subjective Assessment of Sleep in HD Patients - QOL

- Perception of global sleep quality, subjective sleep quality, sleep efficiency, sleep disturbance and daytime sleep dysfunction strongly correlated with
 - Satisfaction with Life Scores
 - Illness Effects Questionnaire Scores
 - BDI and CDI scores
 - MSP scores (perception of social support)

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 - Illness Effects Questionnaire Scores
 - BDI and CDI scores
 - MSP scores (perception of social support)

Subjective Assessment of Sleep in HD Patients - Pain

- Perception of global sleep quality, subjective sleep quality, sleep efficiency, sleep disturbance and daytime sleep dysfunction strongly correlated with
 - perception of pain and its intensity during dialysis
 - perception of pain and its intensity on non-dialysis days

Psychosocial Parameters

- **Depression**
- **Social Support**
- **Satisfaction with Life**
- **Functional Status**
- **Perception of Effects of Illness**
- **Quality of Life**
- **Family**
- **Marital Satisfaction**
- **Satisfaction with Care**

Measures

- **KDQOL** -- 134 items
 - short form 79 items
- Widely used in ESRD studies
- A camel
- Cumbersome, time-consuming administration
- Scoring
- Constructs of SF-36
- Constructs of Kidney-specific domains
- KDQOL vs established comprehensible well-validated psychological domains/constructs

Table 5. Comparison of Mean Values and Standard Deviations Between Patients With CRI and Treated With Hemodialysis

Variables	CRI (n = 50)	Hemodialysis (n = 99)
BDI	8.0 ± 7.0	10.1 ± 8.3*
CDI	4.1 ± 4.1	5.6 ± 5.3
MSP	16.3 ± 4.1	22.4 ± 4.2*
IEQ	37.9 ± 24.7	60.6 ± 2.9*
Karnofsky	86.9 ± 14.7	72.3 ± 16.1*
SWLS	22.8 ± 8.4	23.2 ± 7.6

* $P < 0.001$.

Table 4. Comparison of Mean Values and Standard Deviations Between Patients With CRI and CRF

Variables	CRF (Sacks et al, 1990 ¹² ; n = 16)	CRI (Present Sample; n = 50)
Serum creatinine (mg/dL)	5.4 ± 3.4	3.5 ± 2.1*
IEQ	72.1 ± 10.5	37.8 ± 24.7†
BDI	14.1 ± 10.4	8.0 ± 7.0*
CDI	8.0 ± 7.9	4.1 ± 4.1‡

NOTE. Data are given as mean values ± SD.

* $P < 0.01$.

† $P < 0.001$.

‡ $P < 0.05$.

Dialysis modality and QOL

Comparison PD vs. HD

558 questionnaires given to chronic HD patients, 455 returned (response rate 82%). Fifty of 64 PD patients (78%) returned the questionnaire.

Two groups similar in age, gender and duration of dialysis treatment. Mean QOL was rated at 60+/-18% for HD and 61+/-19% for PD (mean predicted QOL value of 62+/-30 and 58+/-32% respectively).

Results of the five dimensions were similar in both groups, except for a greater restriction in usual activities for PD patients ($P = 0.007$).

Highest scores were for self-care, with 71% HD and 74% PD patients reporting no limitation

Lowest scores for usual activities, with 14% of HD and 23% PD patients reporting severe limitation.

Experiencing pain/discomfort (for HD and PD) or anxiety/depression (for PD) had the highest impact on QOL.

Dialysis modality and QOL

Comparison PD vs. HD

CHOICE Study: Prospective cohort of incident ESRD patients enrolled October 1995 - June 1998

81 outpatient dialysis units in 19 states

698 HD and 230 PD patients who completed a baseline CHOICE Health Experience Questionnaire.

Main outcome: Change in QOL scores from start of dialysis to 1 yr on dialysis

Of 928 patients who completed the baseline questionnaire, 585 also completed the 12-mo questionnaire; 101 had died, 55 had received transplant. 88 had moved to a new dialysis clinic.

PD patients were slightly younger, were more likely to be white, were well-educated, were employed, were married, had less comorbidity, and had higher hematocrit.

Dialysis modality and QOL

Comparison PD vs. HD

Unadjusted baseline scores showed better HRQOL for PD patients in some generic and ESRD domains (bodily pain, travel, diet restrictions, and dialysis access [$P < 0.05$]).

At 1 yr, HD patients had greater improvements in two SF-36 domains (physical functioning and general health perception) than PD patients, but results were mixed for ESRD domains (PD better for finances, HD better for sleep and overall quality of life).

HD and PD patients did not differ in change in overall health status.