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*Delivering information from
medical journals about
caring for ESRD patients*

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An ESRD Network Communication series: Feature Article

Title: **The Association Between Mental Health, Physical Function, and Hemodialysis Mortality**

Citation: Knight EL, Ofsthun N, Teng M, Lazarus JM, Curhan GC. The association between mental health, physical function, and hemodialysis mortality. *Kidney Int.* 2003 May; 63(5):1843-1851.

Implications to your practice

Monitoring the change in biochemical and physical markers of patients with ESRD is common practice and clinicians are well aware of the implications to patient well-being of decreasing physiologic functioning. The impact of the psychosocial status of the patient on their health and longevity is also well known. However, an objective measure of change in this status is not commonly performed.

The SF-36 is a well-studied patient survey instrument for assessing patient mental and physical functioning. The survey can be combined with biochemical data to help assess current well-being, and if administered serially, the predicted well-being of ESRD patients.

Although it is unclear what interventions might change the patient's clinical trajectory, the information may be useful in setting expectations for the patient, their family and the health care team.

Background

High mortality rates remain a reality for ESRD patients of all ages, despite technological advances in hemodialysis. In 1999, the average life expectancy for individuals with ESRD ranged from approximately 2 years for those 75-79 years of age to one and a half years for those 85 years of age and older. Low serum albumin level is one clinical predictor of mortality but consistent associations between other discrete physical and mental findings such as depression to mortality have not been found for the ESRD population. This study examines whether change in self-reported physical and mental status over a period of time along with other variables such as age, gender, cause of ESRD and other factors can be a predictor of mortality for this population and thus assist the clinician in early intervention and proactive intervention for specific populations at particular risk.

Methodology

Data for this study was obtained from the SF-36 Health Survey mental component summary (MCS) and the physical component summary (PCS), a generic, self-reported health survey constructed to assess population differences in physical and mental status and the burden of chronic disease. The survey was administered between 1996 and 1998 to 14,815 ESRD patients at 782 facilities operated by Fresenius Medical Care, North America. Individuals in the study were 20 years of age or older and completed the survey 1 to 3 months after initiation of hemodialysis. Follow-up to the survey began after 3 months of hemodialysis and continued for two years at 6 month intervals.

The mental component summary consists of responses to questions related to mental health, emotional role functioning, social functioning and mental vitality. MCS scores were strongly correlated with validated measures of depression. The physical component score is composed of responses to questions on physical functional status, physical role functioning, bodily pain and general good health. MCS and PCS were standardized (i.e., mean=50, standard deviation=10).

Analysis focused on determining:

- What is the association between initial MCS and PCS scores and mortality over a two-year period?
- Do the MCS and PCS scores have predictive validity regarding mortality of ESRD patients, after controlling for potentially confounding variables including age, gender, race, marital status, diabetes, and cause of ESRD. Others variables included weight, systolic and diastolic blood pressure, urea reduction ratio, albumin, hemoglobin, ferritin, parathyroid hormone, calcium and phosphorus.
- What is the association between six month declines in PCS and MCS scores and patient mortality? The impact of change in MCS and PCS scores were examined from baseline to 4 to 8 months after baseline using multivariate association between 10-point change over 6 months and mortality.
- What is the interaction between age and MCS and PCS scores? Do MCS and PCS have greater clinical utility among certain age classes of ESRD patients? Ages were categorized as less than 45 years, 45 to 54, 55 to 64, 65 to 74 (young old), 75 to 84 (old) and over 85 ("oldest" old).

Results

- The results were presented by age group, MCS and PCS categories. The mean age for the population was 61 (range 20-96 years); the mean MCS score was 46.0 and the mean PCS score was 31.6.

- Older individuals had lower PCS scores compared with younger, but had similar MCS scores to younger patients.
- Those with very low PCS scores, (score less than 20) were likely to be older, female, less likely to be African American, more likely to have type 2 diabetes and have lower albumin and phosphorus levels.
- There was no clear association between MCS scores and population characteristics.
- Age was negatively correlated with PCS scores ($r = -0.20$, $P < 0.001$) but very weakly positively correlated with MCS scores ($r = 0.03$, $P < 0.001$). There was a weak but positive correlation between MCS and PCS scores ($r = 0.04$, $P < 0.001$).
- In age adjusted multi-variate analysis, both the MCS and PCS scores were independently associated with 1 year and 2 year mortality.
- MCS categories were also highly associated with mortality and significant at $P < 0.001$; there was little interaction between the patient's age and their scores.
- PCS categories were also highly associated with mortality and significant at $P < 0.001$ but importantly, the impact of the PCS score on mortality varied by age group and was unexpectedly strongest in the study population younger than 55 years of age. This impact was absent in the oldest old (85 years and older).
- 5773 individuals enrolled in the study were examined at 6-month intervals and given information on their baseline and follow up MCS and PCS scores. Of importance, a 10-point decline in MCS score was associated with significant increase in mortality (hazard ratio = 1.07; 95% CI, 1.02 to 1.12) after adjusting for baseline MCS score.
- A 10-point decline in PCS score was also significantly associated with additional increased mortality (hazard ratio = 1.25; 95% CI, 1.18 to 1.11).
- Age did not appear to be associated with 6-month score change for either the MCS ($P = 0.29$) or PCS ($P = 0.12$)

In conclusion, the study found that self-reported mental and physical function are both highly associated with increased mortality in persons undergoing hemodialysis and that there is also a strong association between a decline in status at 6 months and increased likelihood for mortality. Persons 55 years or younger demonstrated a more pronounced association with mortality related to the PCS, but this may be due to complex and competing risk factors present in the more elderly population.