Spirituality, Social Support, and Survival in Hemodialysis Patients

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Background and objectives: No studies have evaluated the relationship among spirituality, social support, and survival in patients with ESRD. This study assessed whether spirituality was an independent predictor of survival in dialysis patients with ESRD after controlling for age, diabetes, albumin, and social support.

Design, setting, participants, & measurements: A total of 166 patients who had ESRD and were treated with hemodialysis completed questionnaires on psychosocial variables, quality of life, and religious and spiritual beliefs. The religious variables were categorized into three scores on a 0 to 20 scale (low to high levels): Spirituality, religious involvement, and religion as coping. Social support was assessed using the Multidimensional Scale for Perceived Social Support. Analyses were also performed including and excluding patients with HIV infection. Religious variables were categorized on the basis of means, medians, and tertiles.

Results: In analyses that used religious variables, only the responses on the spirituality scale split at the mean were associated with survival. The association of other religious variables with survival did not reach significance. Social support correlated with spirituality, religion as coping, and religious involvement measures. Only social support and age were associated with survival when controlling for diabetes, albumin concentration, HIV infection, and spirituality.

Conclusions: These data suggest that the effects of spirituality may be mediated by social support. Larger, multicenter, prospective studies that use well-validated tools to measure religiosity and spirituality are needed to determine whether there is an independent association of spirituality variables with survival in patients with ESRD.


R elationships between spirituality and mortality have been investigated in medical populations but remain controversial (1–13). Variable associations have been found depending on definitions of spirituality and patient populations studied (1–11). Miller and Thoreson (12) explored nine different hypotheses regarding the relationship among religious beliefs, spirituality, and mortality. The only hypothesis that they found to be supported by persuasive evidence stated that “church/service attendance protects [only] healthy people against death.” Studies supporting a similar link in patients with chronic illnesses have also shown mixed results. Koenig et al. (14) evaluated approximately 4000 elderly patients to determine whether attendance at religious services during a 6-yr period was associated with survival. In adjusted analyses, there was a significantly lower mortality in patients who frequently attended church services.

Many researchers have suggested a publication bias, whereby only the studies that indicate a significant relationship are published (13). Most studies cited the need for more research on the relationship between spirituality and mortality before any firm conclusions can be reached. In addition, the health dimensions of lack of belief have not been well explored.

There also exists considerable debate on how to operationalize religiosity and spirituality. Whereas the first term often is associated with participation in social institutions and adherence to specific beliefs and practices, the latter is a broader term that typically pertains to life’s vital qualities and an overall broad belief in the immaterial features of life (12). Spirituality relates to transcendent values and relationships and the way people find meaning, purpose, and hope in life and in the midst of suffering (15). A person may be spiritual and not religiously observant or observe rituals without a spiritual focus.

Few studies have specifically evaluated the potential association between spirituality and survival in patients with ESRD (16,17). We (18) previously showed that religious and spiritual beliefs are associated with decreased perception of burden of illness, decreased depressive affect, increased perception of social support, and higher satisfaction with life and perception of quality of life in an urban, predominantly black ESRD population. We also found that a “spiritual beliefs scale” correlated with several quality-of-life measures in patients with ESRD (19). Even though many of these psychosocial measures have been shown to be related to survival independently, no study to our knowledge has demonstrated a link between spirituality and survival in this population.
We determined whether three variables related to spirituality, religious beliefs, and practices and faith (spirituality, religious involvement, and religion as a coping measure) were independently associated with survival in hemodialysis patients with ESRD. We then assessed the relationship between social support and survival, regardless of whether the spiritual variables were included in analyses. We hypothesized that spiritual variables would be associated with survival in patients with ESRD.

**Materials and Methods**

**Patient Population and Demographics**

Patients were recruited from two dialysis units under the direction of George Washington University Medical Center full-time faculty nephrologists, located in Washington, DC. The population is composed of primarily black patients and has been described previously (18).

**Recruitment**

All patients who were enrolled in chronic hemodialysis programs at the two dialysis units were eligible to participate. The recruitment period ranged between October 3, 2001, and November 26, 2003. Each patient was initially approached by a trained research assistant who explained the study in detail and invited patients to complete a series of questionnaires regarding psychological status and quality of life. Questionnaires were administered by research assistants, who recorded verbal responses. At the time of data collection, patients gave consent to use the data in mortality analyses. Data collection was approved by the George Washington University Medical Center Committee on Human Research. Follow-up for vital status continued through July 2005.

**Data Collection**

Research assistants tracked the status of all patients by interviews with doctors and staff at both dialysis units, who verified information in the facilities’ computer databases. Data obtained was current status (alive or deceased), date of death, date of transplantation, and last day of treatment (when no follow-up data were available).

**Measures**

We used four items to assess spiritual belief, the importance of attending religious services, and the use of religion in coping with disease. Each question was scored on a scale from 0 to 10. We defined the religious variables as previously conceptualized (18). The “spirituality” score, the perception of the importance of faith and its helpfulness in coping with kidney failure, was the combination of questions 4 and 5 (Table 1). “Religious involvement,” or the perception of the importance of attending religious services and its helpfulness in coping with kidney failure, was defined as the combination of items 6 and 7. In addition, questions 5 and 7 were combined to form a “religion as a coping mechanism” score, a measure of religious feelings as coping mechanisms for dealing with the burden of kidney disease. Each question was scored on a scale from 0 to 10. The highest score attainable was 20 (10 points for each individual item) for each variable.

Social support was assessed using the Multidimensional Scale of Perceived Social Support (MSP) (20,21). The scale, frequently used for patients with chronic kidney disease (22–26), includes 12 questions that measure perceived support from family, friends, and significant others. Patients’ scores were reported on a seven-point Likert scale with total scores ranging from 0 to 84, indicating low to high perceived social support. We (26) previously reported that higher social support scores of hemodialysis patients with ESRD were associated with improved survival.

**Statistical Analysis**

Statistical analyses were performed using SAS 8.2 (SAS Institute, Cary, NC). Data from patients who were alive at the end of the study were censored according to the number of days they survived. Twelve patients lacked survival time data. Data from 18 patients who were lost to follow-up were censored at their last day of treatment at their respective dialysis units. Data from 14 patients who had received transplants during the study period were censored depending on their known vital status. Data from transplant patients who were lost to follow-up were censored at date of transplantation.

Kaplan-Meier curves were constructed on the basis of spiritual parameters and MSP scores. Religious variables were categorized on the basis of medians, means, and tertiles. In survival analyses in which levels of the religious variables were categorized, the results of splits at the mean are presented.

Spearman correlation analyses were determined on the three spiritual variables and the social support scores. Proportional hazards regression was used to calculate the association of each religious variable with mortality. Analyses were then performed to assess the relationship of social support to survival with and without the spirituality variables. Covariates in all analyses included age, diabetes status, serum albumin concentration, presence of HIV infection, and level of social support in selected analyses. P = 0.05 was taken as the level of significance.

**Results**

**Demographics and Patient Population**

The sample was composed of 102 (61.4%) men and 64 (38.6%) women. A total of 89.2% of the study patients were African American, 7.8% were white, and 3.0% identified themselves as of other ethnicity. Ninety-five patients were recruited from one unit and 75 from the other. The study patients’ demographics are outlined in Table 2. The mean age of the population was 56.2 ± 13.8 yr. A total of 45.2% had diabetes, and 11.5% had HIV infection. The mean serum albumin concentration was 3.8 ± 0.4 g/dl. Patients’ mean Kt/V was 1.4 ± 0.24. The mean duration of treatment on dialysis at the time of administration of the original questionnaire was 41.2 ± 43.5 mo. By the con-
Table 2. Patient demographic and clinical characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>166</td>
</tr>
<tr>
<td>Race (%)</td>
<td></td>
</tr>
<tr>
<td>black</td>
<td>89.2</td>
</tr>
<tr>
<td>white</td>
<td>7.8</td>
</tr>
<tr>
<td>other</td>
<td>3.0</td>
</tr>
<tr>
<td>Male (%)</td>
<td>61.5</td>
</tr>
<tr>
<td>Diabetes (%)</td>
<td>45.2</td>
</tr>
<tr>
<td>HIV infection (%)</td>
<td>11.5</td>
</tr>
<tr>
<td>Age (yr; mean ± SD)</td>
<td>56.2 ± 13.8</td>
</tr>
<tr>
<td>HD duration at study initiation (mo; mean ± SD)</td>
<td>41.2 ± 43.5</td>
</tr>
<tr>
<td>HD duration at study conclusion (mo; mean ± SD)</td>
<td>68.0 ± 45.7</td>
</tr>
<tr>
<td>duration of follow-up (mo; mean ± SD)</td>
<td>19.4 ± 11.1</td>
</tr>
<tr>
<td>serum albumin concentration (g/dl; mean ± SD)</td>
<td>3.80 ± 0.40</td>
</tr>
<tr>
<td>Kt/V (mean ± SD)</td>
<td>1.40 ± 0.24</td>
</tr>
</tbody>
</table>

*HD, hemodialysis.

Table 3. Patient spiritual, religious, and social support characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirituality</td>
<td>17.5 ± 4.1</td>
<td>20</td>
<td>20</td>
<td>0 to 20</td>
</tr>
<tr>
<td>Religious involvement</td>
<td>16.1 ± 6.0</td>
<td>19</td>
<td>20</td>
<td>0 to 20</td>
</tr>
<tr>
<td>Religion as coping</td>
<td>16.5 ± 4.9</td>
<td>18</td>
<td>20</td>
<td>0 to 20</td>
</tr>
<tr>
<td>Social support</td>
<td>69.1 ± 13.2</td>
<td>72</td>
<td>84</td>
<td>22 to 84</td>
</tr>
</tbody>
</table>
Higher religious involvement and religion as coping mechanism scores were not associated with survival, regardless of whether patients with HIV infection were included in analyses (data not shown). There was no significant association of spirituality scores and survival when evaluated by median split.

Higher social support scores were associated with longer survival in the entire sample (HR 0.48; 95% CI 0.27 to 0.84; \( P < 0.01 \); Table 5). This relationship persisted regardless of whether patients with HIV infection were included in analyses. MSP scores also predicted survival when analyses with religious involvement and religion as coping mechanism variables were entered as covariates in place of the spirituality measure (data not shown).

When spirituality and MSP scores were included in the analyses together with age, albumin, diabetes, and HIV status as covariates, social support was still associated with increased survival (HR 0.53; 95% CI 0.30 to 0.95; \( P = 0.03 \); Table 6). This relationship persisted regardless of whether patients with HIV infection were included in analyses (data not shown). MSP scores also predicted survival when analyses with religious involvement and religion as coping mechanism scores were entered as covariates in the place of spirituality (data not shown). The relationship between spirituality and survival approached statistical significance in this analysis (HR 0.57; 95% CI 0.31 to 1.04; \( P = 0.066 \); Table 6). There was no statistically significant interaction between the spirituality and social support variables in the Cox analyses outlined in Table 6 in the entire sample (data not shown).

**Discussion**

This study showed that increased spirituality, defined as importance of faith, as measured by a particular tool, was associated with improved survival in a hemodialysis population with ESRD at a single medical center. All three religion and spirituality measure scores in this study suggested ceiling effects, with most participants endorsing the maximum score. The associations between the spirituality variable and survival, however, were found even though the spirituality measures displayed ceiling effects. This relationship was previously shown in general medical populations (1–12). Religious experience was separated in this study into three variables to determine how each was associated with survival. Whereas increased “spirituality” was associated with survival, “religion as

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**Table 4. Correlation matrix of religious variables and social support (Spearman analyses)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>IREL</th>
<th>CREL</th>
<th>SPIR</th>
<th>MSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>IREL</td>
<td></td>
<td>1.00</td>
<td>0.88</td>
<td>0.67</td>
</tr>
<tr>
<td>CREL</td>
<td>0.88</td>
<td></td>
<td>1.00</td>
<td>0.85</td>
</tr>
<tr>
<td>SPIR</td>
<td>0.67</td>
<td>0.85</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>MSP</td>
<td>0.22</td>
<td>0.29</td>
<td>0.33</td>
<td></td>
</tr>
</tbody>
</table>

\( P < 0.0001 \) for IREL, CREL, SPIR, and MSP.

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(a) CREL, religion as coping mechanism score; IREL, religious involvement score; MSP, Multidimensional Scale of Perceived Social Support score; SPIR, spirituality score.

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**Figure 1.** Kaplan-Meier analysis of patients with ESRD and with high *versus* low spirituality. Gray line represents high spirituality (above the mean), and black line represents low spirituality.

**Figure 2.** Kaplan-Meier analysis of patients with ESRD and with high *versus* low social support. Gray line represents high social support, and black line represents low (below the mean) social support.
a coping mechanism” and “religious involvement” were not
associated with decreased mortality in this relatively small
study, suggesting that the instruments used may have been
able to discriminate between an overall sense of “spirituality”
and other factors that are associated with religious experience.

We also found that increased perception of social support
was associated with survival. This relationship was shown
in previous studies of patients with a variety of chronic medical
illnesses (25–31); however, there has been limited information
regarding the relationship between social support and survival
in patients with ESRD (26,31–34). In adjusted analyses, we
found that dialysis patients with higher MSP scores survived
longer than those with lower perceived social support levels.
Previously, we showed that a 1-SD increase in perceived social
support among hemodialysis patients was associated with a
20% decrease in mortality (26,31,35).

Social support may improve patient outcomes through at
least five mechanisms in patients with chronic disease, includ-
ing increased access to health care, increased compliance with
physician prescriptions, improvements in nutritional status and
overall sense of quality of life, modulation of the immune
system, and a decrease in depressive affect (26,31). The corre-
lation coefficient between the religious variables and the social
support scores was associated with statistical significance but
indicates a modest relationship among these variables. This
may be the result of a true weak relationship among these
factors, suggesting an independent association of the two fac-
tors with survival, or, alternatively, may be related to the
specific tools that we used. Such issues need to be addressed in
well-designed follow-up studies, with validated measures.

There is also a relationship between religion and increased
perception of social support (36). People who identify them-
selves as spiritual or religious are often involved in religious
communities and typically report higher social support scores
compared with individuals who are not identified as religious.

In a multicenter study that included this patient population,
we previously showed that quality-of-life assessments but not
demographic or medical characteristics correlated with a spir-
itual beliefs scale (19). In a previous report on the baseline
characteristics of this study population, we showed that all
three spiritual scales correlated with increased perception of
satisfaction with life and decreased indices of depressive affect
and assessments of illness burden (18). Both depression and
perception of illness burden have been associated with in-
creased mortality in patients with ESRD in our studies (26,37),
as well as others (38–40). Koenig (41) recently delineated the
salient interconnections between spiritual values and coping,
associated with lower levels of depression. These findings sug-
gest that spiritual beliefs are indeed associated with psychoso-
cial factors, which have been linked to enhanced survival in
several different chronic illnesses (42).

Although spiritual factors may have an independent associ-
ation with survival in the chronically ill and in patients with
ESRD, the mechanisms underlying any such links remain un-
clear. Recently, we summarized studies that linked psychoso-
cial factors to stressors (31,42), which may activate immune
and inflammatory responses that are associated with enhancing the
susceptibility to infection or the development of atherosclerosis
(42,43). Unfortunately, we do not have information regarding

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HR</th>
<th>95% CI</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td><strong>Analysis 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>albumin</td>
<td>0.31</td>
<td>0.13 to 0.75</td>
<td>0.001</td>
</tr>
<tr>
<td>HIV infection</td>
<td>3.53</td>
<td>1.32 to 9.48</td>
<td>0.010</td>
</tr>
<tr>
<td>spirituality</td>
<td>0.49</td>
<td>0.27 to 0.88</td>
<td>0.020</td>
</tr>
<tr>
<td><strong>Analysis 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>albumin</td>
<td>0.32</td>
<td>0.13 to 0.79</td>
<td>0.010</td>
</tr>
<tr>
<td>HIV infection</td>
<td>2.71</td>
<td>1.02 to 7.23</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>social support</td>
<td>0.48</td>
<td>0.27 to 0.84</td>
<td>0.010</td>
</tr>
</tbody>
</table>

*All analyses controlled for age and diabetes. CI, confidence interval; HR, hazard ratio

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin</td>
<td>0.30</td>
<td>0.12 to 0.73</td>
<td>0.008</td>
</tr>
<tr>
<td>HIV infection</td>
<td>3.03</td>
<td>1.12 to 8.19</td>
<td>0.030</td>
</tr>
<tr>
<td>Spirituality</td>
<td>0.57</td>
<td>0.31 to 1.04</td>
<td>0.066</td>
</tr>
<tr>
<td>Social support</td>
<td>0.53</td>
<td>0.30 to 0.95</td>
<td>0.030</td>
</tr>
</tbody>
</table>

*All analyses controlled for age and diabetes.
these mediators or the causes of death in the patients in this relatively small pilot study.

In analyses in which spirituality and social support were assessed simultaneously, the link between spirituality and survival in this population was attenuated. This suggests that higher social support may mediate the effect of increased spirituality on survival. One reason that spirituality might not have significantly predicted survival above and beyond social support, in addition to the limited sample size, is that the ceiling effects on the spirituality measure may have limited the ability to detect effects of spirituality. With a modal score of 20 and a mean score of 17.5, it seems that the scores fell in a fairly restricted range in this relatively religious population. With a more sensitive measure allowing a much wider range of scores in the high spirituality category, it is possible that we might have been able to detect significant variance above and beyond that contributed by social support. Such considerations may have determined the lack of significance in our analyses of spirituality using median splits. A median split in this case reflects a comparison between the extremely spiritually oriented and those who scored just slightly lower, perhaps diminishing the ability to demonstrate differences; however, it is also possible that other, unaccounted variables contribute to the relationship of spirituality with survival and between religious variables and social support. In addition, it would be desirable to study a population with more diverse spiritual and religious characteristics, including atheists and nonobservant participants, including a wide range of denominational affiliations.

This study has several limitations. The spirituality scales that we used, devised in collaboration with the Robert Wood Johnson Foundation Promoting Excellence in End-of-Life Care End-Stage Renal Disease Work Group (44), have not been fully validated or subjected to test–retest reliability determinations; therefore, confirmatory studies stemming from our exploratory findings will need to be performed using these measures after validation or other validated parameters. In addition, because the determination of "spirituality" and "religiosity" in clinical studies has not been uniform or endorsed by consensus, it should be noted that the measures used in this study cannot reliably distinguish between these characteristics. The skewed responses to the questionnaires suggest that broader populations will have to be studied and/or that the measures may need to be rescaled. The questionnaires were administered by research assistants. As noted previously, this presents an issue of potential experimental demand (18), but such data collection methods are necessary in populations that have high levels of illiteracy and have the advantage of maintaining uniform administration. As outlined previously, surveys that sample a dialysis unit population over a period of time do not take into account stage of the life cycle of the patient with ESRD (42,45), which may contribute to the heterogeneity of findings. Further studies should be performed in defined populations, such as incident patients, or using longitudinal follow-up to address this limitation. The relatively small sample size of this study and the number of events preclude the use of a large number of standard covariates in Cox regression analyses (46). We do not have data on hospitalizations, cause of death, or religious denomination in this pilot study, which limits the conclusions that can be drawn from our findings. The patient population was primarily composed of urban black patients with ESRD, which may further limit study generalizability. Tanyi et al. (17) specifically showed that black individuals have high spirituality scores, at baseline, compared with a white cohort. In addition, our sample was composed primarily of prevalent patients, raising the possibility of survival bias.

Interactions between patients’ underlying medical illness and their environment influence psychological adjustment and play a unique role in the pathogenesis and progression of disease. This complexity makes it difficult to establish causality in a cohort study. Another inherent limitation of an observational study is the potential for recall and selection biases. The more compliant and “healthier” patients may have been more likely to participate in surveys. It is also possible that experimental demand (18) and social desirability may have influenced the patients’ answers to interviewers’ questions with respect to quality of life and spirituality.

Conclusions

An association between spirituality and survival may be partially explained by increased perception of social support in hemodialysis patients who participate in religious activities. Larger, multicenter, prospective cohort studies, including longitudinal observations and assessments of cardiovascular risk factors and inflammatory mediators, as well as broader consideration of other psychosocial factors such as socioeconomic factors and perception of discrimination (42) are needed for further evaluation of any fine-grained relationships between spirituality and survival in patients with ESRD, with broader participation of different ethnic groups from different parts of the country and the world.

Acknowledgments

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Disclosures

None.

References


