

Religiosity in a Hemodialysis Population and Its Relationship to Satisfaction With Medical Care, Satisfaction With Life, and Adherence

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● **Background:** The religious beliefs and spirituality of patients on hemodialysis (HD) therapy have not been studied extensively. Studies of the dialysis population seem to indicate that religion may be associated with increased patient satisfaction with life and increased levels of social support. **Methods:** Using multiple religiosity scales and scales to assess patient satisfaction with life and social support, we studied the relationship between religiosity and medical and/or social factors and adherence to treatment in 74 HD patients. **Results:** High scores on the Intrinsic Religiosity Scale were associated strongly with high scores on the Satisfaction With Life Scale, whereas age and high Organizational Religious Activity Scale scores were associated strongly with high scores on the Satisfaction With Medical Care Scale. Older age was associated strongly with increased adherence. No relationship existed between religiosity and adherence in our population. **Conclusion:** Religious beliefs are related strongly to measures of satisfaction with life, whereas religious behaviors are related to satisfaction with medical care. Age is the single most important demographic factor associated with adherence. Because of the complex nature of religiosity, additional investigation is in order. *Am J Kidney Dis* 44:488-497.

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INDEX WORDS: Religiosity; satisfaction; adherence; hemodialysis (HD).

THE ASSOCIATION between religion and spirituality and clinical outcomes is gaining popularity in the medical literature. Studies of the dialysis population seem to indicate that religion may be associated with increased patient satisfaction with life and increased levels of social support.¹ Studies of different populations show that religion affects health, and it is reasonable to assume that it may do so by influencing adherence.² However, very few studies have investigated the impact of religion on the quality of life and adherence of patients on kidney dialysis

therapy. In an attempt to evaluate this, Patel et al³ examined the relationship between religious beliefs, quality of life, and psychosocial measures in patients with end-stage renal disease (ESRD) on dialysis therapy. They found that religious beliefs were related to perception of depression, illness effects, social support, and quality of life independent of medical aspects of illness.³ However, because of the design of their study (correlational analysis of cross-sectional data), it was difficult for them to establish causality. Also, because they used only baseline and bivariate relationships, they were unable to determine directionality. The relationship between these variables, in their opinion, still warrants attention.³

Adherence with dietary, fluid, and medical instruction is critically important for the health and well-being of patients on long-term hemodialysis (HD) therapy. Adherence is defined as the extent to which an individual chooses behavior that coincides with a clinical prescription.⁴ In patients with ESRD, renal therapy generally is accomplished by means of HD, which is undertaken 3 times a week for 3 to 4 h/session.⁵ Patients also must follow a complex dietary regimen and take medication. Although nonadherence with prescribed therapy significantly increases the risk for complications and death associated with HD patients, nonadherence rates

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of 50% or greater have been found in some studies of patients with ESRD.⁶

Although nonadherence can be related to the complexity of treatment, more information about the social background of patients on dialysis therapy may help clarify some of the reasons for the high levels of nonadherence. Patients with kidney failure are well suited for the study of nonadherence because patient contact is prolonged and intensive, the patient cannot switch doctors or treatment facilities easily, the medical regimen is clear cut, and treatment is long term.⁷ Here, we test the hypothesis that religiosity would be associated positively with greater satisfaction with life, satisfaction with medical care, and social support and less depression in the adult HD population, and also that religiosity would be associated with greater adherence in the HD population.

METHODS

Study Population

Sites for data collection were the Gambro dialysis units at Presbyterian Hospital and on 42nd and Walnut Streets in Philadelphia, PA. All 358 patients at these 2 sites were eligible. They were approached by University of Pennsylvania/Gambro faculty and asked if they would be willing to participate in the study. All patients gave their informed consent, and both the University of Pennsylvania Institutional Review Board and Gambro approved the study. All participants were interviewed by the same graduate student (E.B.) while being dialyzed. The questionnaires were read to the patients, and the researcher recorded their answers. Interviews took an average of 45 minutes to complete.

Religious and Spiritual Beliefs

Religious and spiritual beliefs were measured using the Hoge Intrinsic Religiosity Scale, a 10-item scale graded on a Likert-like scale of 1 to 5. The scale asks about internal religious beliefs by using such statements as: (1) My faith involves all of my life. (2) In my life, I experience the presence of the Divine. (3) Although I believe in religion, I feel there are many other important things in life. (4) My faith sometimes restricts my actions. (5) I try hard to carry religion over into all my other dealings in life.

The quantitative answers to the religiosity questions were used to determine the internal feelings of patients about religion. Most patients elaborated on the answers that they gave with more qualitative feelings consistent with the responses obtained from the survey. The Hoge Intrinsic Religiosity Scale has been validated in 2 separate studies by using responses of rabbis, community pastors, and priests as a criterion standard. It has been used in a number of different studies to capture the intrinsic aspects of religiosity^{8,9} and has its origins in the intrinsic-extrinsic perspective of reli-

gious commitment developed at Harvard University by Allport and Ross.¹⁰

The organizational and nonorganizational scales also have been used in a variety of studies that assessed various aspects of religiosity.¹¹⁻¹³ The Organizational Religious Activity Scale was used to measure the degree to which patients participate in group religious activities, such as Bible study or prayer groups. Conversely, the Nonorganizational Religious Activity Scale asks about private religious activities, such as private prayer. These scales consist of 2 and 3 questions, respectively. The Organizational Religious Activity Scale, Nonorganizational Religious Activity Scale, and Intrinsic Religiosity Scale were used to assess both intrinsic and extrinsic religiosity.

Karnofsky Performance Scale

The Karnofsky Performance Scale was used to determine the functional ability of patients to perform normal activities of daily life. It is graded on a scale of 0 to 100, with 0 meaning death and 100 meaning full ability to carry out normal activity. A score less than 70 represents a functional capacity that requires some level of additional assistance, and a score less than 50 represents a level of functional capacity that requires some level of institutionalization. It has been used extensively in patients with ESRD.¹⁴⁻¹⁶

Beck Depression Inventory

The Beck Depression Inventory was used to measure depression. It is a well-validated instrument that has been used in previous studies of patients with ESRD.¹⁷ It measures both the presence of depression and its level. The instrument consists of 20 questions that ask about both the cognitive and somatic aspects of depression. Higher scores on the Beck Depression Inventory indicate more depression.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support has been used in patients with chronic renal disease¹⁸ and ESRD.^{19,20} It has acceptable internal and test-retest reliability.²¹ The scale consists of 12 items that ask about significant others, family, and friends. Higher scores indicate a greater perception of social support.

Satisfaction With Life Scale

The Satisfaction With Life Scale, a 5-item scale that asks about conditions of life and satisfaction with present and past life, was used as a quality-of-life measure. The Satisfaction With Life Scale asks about ideal life and satisfaction with past and present life. It has been reported as having good internal reliability and 2-month test-retest reliability. In addition, there are moderate correlations between this scale and a large number of subjective well-being scales.²² It also has been used previously in the dialysis population.^{19,20} Higher scores on this scale indicate greater satisfaction with life.

Satisfaction With Medical Care

Patient satisfaction with medical care was measured by using 4 questions that asked about patient satisfaction with

their nephrologist. The questions dealt primarily with patient attitude toward their doctor and were taken from the Patient Satisfaction Scale.^{19,20} They included such questions as whether the patient would recommend their doctor to a friend.

Coping Behavior

Coping behaviors were measured by using a 40-item Coping Scale. Questions were graded on a scale of 1 to 5 and measured the extent to which patients showed problem-solving as opposed to affective behaviors when responding to difficulties in their life.^{19,20}

Schwartz Outcome Scale

The Schwartz Outcome Scale was used to assess patient satisfaction with life and mental status. It is a 10-item scale graded on a scale of 0 to 6. Questions ask about patient ability to resolve conflict, patient ability to relate to others, and general satisfaction with life. Higher scores indicate more satisfaction with life and mental health.²³ The scale has been used in other studies, and research supports its validity.²⁴

Adherence

There are many different ways of measuring adherence in the dialysis population. Medication adherence can be measured both directly with drug or marker assays of biological fluids and direct patient observation and indirectly through patient reports, prescription record reviews, and pill counts.²⁵ Dietary adherence has been measured by monitoring serum potassium levels. It has been suggested as an objective measure of dietary intake adherence, but there are several factors in addition to dietary intake of potassium that influence these levels, including magnitude of urine output, residual renal function, and hormonal and acid-base status.²⁶⁻²⁹ Other dietary adherence measures, including circulating blood urea nitrogen concentration, serum phosphate level, and other-day weight gain, also are affected by factors not related to adherence.³⁰ Because of the confounding factors involved in dietary and medication adherence measures, we chose to use behavioral measures of adherence in our study. Kaveh and Kimmel³⁰ suggested that although assessment of indirect indices of adherence is useful, behavioral adherence measures generally should be used in the dialysis population. We measured adherence by examining patient records and recording the number of missed dialysis sessions during a period of 4 months before the study and coding adherence as the percentage of scheduled appointments attended (ie, 100 if no sessions were missed). If a patient missed a dialysis appointment because of acute illness, incapacitation, or hospitalization, this was not considered nonadherence. The interviewer was not aware of the adherence history of the individual patient at the time of the survey. In addition to using missed dialysis sessions as a measure of compliance, the number of shortened sessions was measured. Because the vast majority of patients on dialysis therapy are scheduled for 3 visits/wk, this measure was calculated as the absolute number of shortened sessions as opposed to being measured as a percentage.

Statistics

Regression modeling was planned for the analysis of hypotheses regarding relationships between religious beliefs and practices and satisfaction with life and medical care, social support, depression, and medical adherence. Multiple linear and logistic regression analyses were performed using STATA 7.0 software (Stata Corp, College Station, TX). *P* less than 0.05 is considered statistically significant.

RESULTS

Demographics

The sample that was randomly chosen reflected the demographics of the 358 urban dialysis patients available for study in terms of age, race, and number of employed patients. Average age in the 2 centers was 56 years; our patients had a mean age of 54 years. Average number of non-Hispanic African Americans at the dialysis centers was 83%, whereas our study included 89% African Americans. There was an 11% employment rate in patients in our study, whereas the employment rate in the 2 centers was 14%. A power analysis was performed to select the target number of 70 to 80 patients. Between June and August 2003, we approached 80 patients in a random order from the dialysis list to participate in the study, and 74 patients (92%) agreed. We were pleased that such a high percentage of patients who were approached agreed to participate in the study. Reasons for this high rate of participation are not totally clear, but likely include that the study was noninvasive, was completed in 1 session while the patient was undergoing HD, and involved minimal effort on the part of the patient. Demographic data of the sample are listed in [Table 1](#). The sample consisted of 74 patients: 31 men and 43 women. Women were slightly older than men, but the age difference was not significant. Eighty-nine percent were African American, which is not unexpected given the urban location and that African Americans have a much greater incidence of ESRD than Caucasians.³¹ Fourteen of 17 widowed patients were women.

Adherence

Our hypothesis that adherence would be related to religiosity in the dialysis population was not supported by the data, which showed no relationship between adherence and religiosity (determined by using all 3 religiosity scales).

Table 1. Patient Demographic, Psychosocial, and Clinical Characteristics

Total no. of patients	74
Mean age (y)	54.0 ± 16.6 (21-84)
African American (n = 66) (%)	89
Mean time on dialysis (y)	3.5 ± 2.7 (0.25-25)
Listed for transplant (n = 35) (%)	47.3
Men (n = 31) (%)	42
Women (n = 43) (%)	58
Employed (n = 8) (%)	11
Unemployed (n = 66) (%)	89
Monday/Wednesday/Friday (n = 44) (%)	59
Tuesday/Thursday/Saturday (n = 30) (%)	41
Mean Beck Depression Inventory Score	8.4 ± 6.2 (0.0-32.0)
Mean Karnofsky Performance Scale Score	93.4 ± 9.3 (60.0-100.0)
Mean Patient Satisfaction Scale Score	16.1 ± 4.1 (4.0-20.0)
Mean Social Support Score	53.2 ± 7.1 (26.0-60.0)
Mean Coping A Score	2.8 ± 0.5 (1.9-4.0)
Mean Coping B Score	3.7 ± 0.6 (2.4-4.7)
Mean Satisfaction With Life Scale Score	16.6 ± 5.5 (5.0-25.0)
Mean Schwartz Outcome Scale Score	49.7 ± 9.0 (28.0-60.0)
Mean Hoge Intrinsic Religiosity Scale Score	38.4 ± 7.9 (10.0-50.0)
Mean Organizational Religious Activity Scale Score	4.1 ± 2.1 (2.0-9.0)
Mean Nonorganizational Religious Activity Scale Score	10.3 ± 2.8 (3.0-15.0)
Mean adherence	95.3 ± 7.5 (61.0-100.0)

NOTE. Values expressed as mean ± SD (range) or percent.

Using multiple linear regressions, the only models of significant predictors of adherence were age and years on dialysis therapy. This was confirmed by a stepwise procedure yielding the same model. Our data indicate that a greater level of adherence was associated with older age and a greater number of years on dialysis therapy (Table 2).

Satisfaction With Life

Satisfaction with life was related to a number of measures, including age, Beck Depression Inventory, and higher Intrinsic Religiosity Scale scores, and was greater among patients who

Table 2. Multiple Linear Regression Results Showing Predictors of Adherence

Factor	Coefficient	t	P
Patient age	0.18	3.65	<0.001
Years on dialysis	0.76	2.36	0.021
Constant	82.8	25.6	<0.001

NOTE. Adherence measured as percentage of attendance at scheduled dialysis appointments in the 4 months preceding the study interview.

dialyzed on a Tuesday/Thursday/Saturday schedule (Table 3). Thus, older patients expressed greater satisfaction with life, as did those who scored low on the Beck Depression Inventory and were not depressed. Surprisingly, patients dialyzed on the Tuesday/Thursday/Saturday schedule also expressed more satisfaction with life. This may be related to the fact that patients who are involved in activities (eg, work, charity), and therefore presumably more “functional,” choose a Tuesday/Thursday/Saturday schedule to not interfere with these activities; however, this requires additional investigation. Discussion with the staff at the dialysis center indicated that patients dialyzed on the Tuesday/Thursday/Saturday schedule were more cooperative and seemed “happier”; however, they could not provide us with an adequate explanation about why. The Schwartz Outcome Scale, also used as a measure of patient satisfaction with life, correlated strongly with the Satisfaction With Life Scale.

Satisfaction With Medical Care

In multiple regressions involving satisfaction with medical care, 2 alternative models were

Table 3. Multiple Linear Regression Results Showing Predictors of Patients' Reported Satisfaction With Life

Factor	Coefficient	t	P
Patient age	0.11	3.41	0.001
Beck Depression Inventory	-0.32	-3.85	<0.001
Hoge Intrinsic Religiosity Scale	0.22	3.30	0.002
Dialysis schedule (Monday/Wednesday/Friday v Tuesday/Thursday/Saturday)	-2.6	2.40	0.019
Constant	11.5	2.82	0.006

Table 4. Two Alternative Multiple Linear Regression Models for Patient Satisfaction With Medical Care

Factor	Coefficient	t	P
Model 1			
Organizational Religious Activity Scale	0.50	2.36	0.021
Patient age	0.06	2.28	0.026
Constant	10.7	6.23	<0.001
Model 2			
Organizational Religious Activity Scale	0.51	2.35	0.021
Satisfaction with life	0.17	2.09	0.040
Constant	11.2	6.74	<0.001

NOTE. As listed in Table 3, patient age correlated significantly with satisfaction with life.

shown. Patient satisfaction with medical care was greater for those who had higher Organizational Religious Activity Scale scores and those who were either older or reported more satisfaction with life (Table 4).

Coping

The Coping Scale, which assessed whether patients with a high degree of religiosity used different coping mechanisms, did not correlate strongly with any other measure. In addition, the 2 different coping mechanisms outlined in the scale (affective and problem solving) were found to correlate highly with each other. Results indicate that additional study should be performed to determine whether the Coping Scale could function as a valid method of determining coping ability in the dialysis population.

Religiosity

A stepwise regression showed that the Intrinsic Religiosity Scale varied predictably with several variables, including social support, satisfaction with life, Beck Depression Inventory, and employment. In simple regressions, these relationships appear to be in the same direction. Social support and satisfaction with life were the most highly correlated of all measures with the Intrinsic Religiosity Scale, indicating that people who have strong internal religious feelings have more social support and are more satisfied with their lives. Although the relationship between employment and the Intrinsic Religiosity Scale was weak, 5 of 8 employed patients scored very high on the Intrinsic Religiosity Scale. This can be

interpreted in a variety of ways. For example, those who have strong faith also may possess a strong work ethic. Alternatively, those who are employed are likely to be the most functional.

Both Organizational Religious Activity and Nonorganizational Religious Activity Scales had a weaker correlation than the Intrinsic Religiosity Scale with either of these measures. However, female sex and increasing age were both associated with higher nonorganizational religious activities scores.

Transplant Listing

Patients most likely to be listed for transplantation were younger (odds ratio, 0.94; $z = -3.46$; $P < 0.001$). Surprisingly, there was no relationship between Karnofsky Performance Scale score, a measure of the functional ability of patients to perform activities of daily living, and the likelihood of listing, but this may occur because most patients scored high on the Karnofsky Performance Scale.

Shortened Sessions

Data for shortened sessions were available for only 60 patients. Our shortening average was 18% as opposed to the 5% nonadherence rate obtained when using number of missed sessions as a variable. Using this model, a number of factors seemed to be related. Age and satisfaction with life correlated ($P = 0.0045$). Patients on dialysis therapy longer seemed to be less adherent. The only significant predictor of adherence based on the number of shortened sessions was age. Religiosity, coping, and depression variables were not significant in this analysis. These data are consistent with our analysis including missed sessions and strengthen our conclusion that religiosity and adherence do not seem to be related in this population.

DISCUSSION

When using number of missed treatments as our measure of adherence, our primary findings were that high scores on the Intrinsic Religiosity Scale were strongly associated with high scores on the Satisfaction With Life Scale, whereas age and high Organizational Religious Activity Scale scores were strongly associated with high scores on the Satisfaction With Medical Care Scale. We could not detect an association between religious

beliefs and adherence. Similarly, when using number of shortened sessions as the measure, our primary finding was that increased age correlated with greater adherence. We also found that a number of other variables were related when using this measure, such as age and satisfaction with life. As was the case when using number of missed sessions as a measure of adherence, we could not detect a significant association between religious beliefs and adherence.

Many factors have been hypothesized to have an effect on adherence in patients with ESRD. These include sociodemographic factors, situational factors, knowledge of the regimen, family relationships, patient-staff relationships, and psychological factors.³²

The relationship between religion and mental and physical health has been investigated. At least 60 studies have examined the role of religion in such medical conditions as arthritis, diabetes, kidney disease, cancer, heart disease, lung disease, human immunodeficiency virus infection, cystic fibrosis, sickle cell disease, amyotrophic lateral sclerosis, and chronic pain.³³ In a study of 850 consecutively admitted hospitalized patients, those who identified themselves as religious coped better independent of demographic characteristics, social support, economic resources, psychiatric history, and physical health status.³⁴

However, as noted, we did not find a relationship between coping and religiosity in our study. In addition, the scales used to measure coping were not related to any other variable, such as satisfaction with life or social support. This may be caused by the relatively small sample of patients in our study, which makes it difficult to pick up subtle relationships. It also is possible that patients on dialysis therapy showed unique coping mechanisms, different from those used by patients in the study by Koenig³⁴ of elderly, hospitalized, medically ill men. Cross-sectional and longitudinal studies have shown that religious and spiritual coping are associated with less depression during illness.³³ Religious involvement and spiritual well-being also have been associated with greater levels of health-related quality of life in patients with cancer, human immunodeficiency virus infection, and heart disease. This direct relationship persists despite declines in physical functioning.³⁵

Religious involvement also is associated with improved attendance at scheduled medical appointments,³⁶ greater cooperativeness,² better adherence,^{2,37,38} and improved medical outcomes.^{39,40} A number of studies found that persons who are more religious or spiritual have lower blood pressure,⁴¹ fewer cardiac events,⁴² and longer survival in general.^{43,44}

Although the relationship between religion, treatment outcomes, and health measures seems positive, there also have been a number of studies suggesting that the relationship is not totally clear. One study performed to assess the effect of spirituality on the successful recovery from spinal surgery found, perhaps not surprisingly, that recovery was more strongly related to patient selection and surgical technique than to spirituality.⁴⁵ Matthews et al⁴⁶ found that the effect of intercessory prayer and positive visualization on the well-being of patients on dialysis therapy could not be distinguished from the effect of expectancy. Another study found there is insufficient evidence available to link religious attendance to health.⁴⁷

There also have been some results suggesting that religion may have a negative role in patient outcome and health measures. Powell⁴⁸ found no link between depth of religiousness and physical health. In addition, his research failed to support the notion that religion and/or spirituality improves recovery from acute illness. He concluded that religion or spirituality might even have impeded recovery from acute illness. In a similarly surprising study, 250 patients with chronic illness were studied at a London teaching hospital. Seventy-seven percent of patients expressed some spiritual beliefs. When patients were assessed 9 months after admission, it was found that patients who had stronger beliefs were 2 to 3 times more likely to remain the same or deteriorate.⁴⁹ Although the number of studies suggesting that religion has no effect or a negative effect on health are fewer than those reporting a positive response, this could be because negative results are less likely to be published.⁵⁰

In addition, religiosity is associated with lower use of physician services in patients with type 2 diabetes⁵¹ and less use of antiretroviral therapy in patients with human immunodeficiency virus infection.⁵² In the latter study that included 202 human immunodeficiency virus–positive pa-

tients, 23% of patients who indicated that prayer was the most important influence on their decision regarding antiretroviral medication were noncompliant with the medical regimen. This is significantly greater than the 7.1% nonadherence rate found in the rest of the population.⁵²

Despite the complex and contradictory nature of this information, there has been limited evaluation of the religious and spiritual feelings of patients with chronic illness^{1,53-56} and even less for HD patients.⁵⁷ Evaluations that have been done often used outward measures of religiosity to identify religious patients. This may be a result of the greater consensus on how to measure and define religious involvement as opposed to spirituality.⁵⁸ One study found that although increased religiosity is associated with increased patient satisfaction with life and increased levels of social support, none of the religious and spirituality measures correlated with behavioral adherence measures or levels of serum albumin, hemoglobin, or Kt/V (Kt/V is used as a measure of the adequacy of HD).³⁰

Although there is reason to think there may be a relationship between religion and adherence with treatment, we found no association between religiosity and adherence in this study. This may be caused by the small number of irreligious patients in our sample (only 5 patients denied any religious affiliation). However, we found a strong association between adherence and increased age. This association persisted when we used number of shortened sessions as a predictor of compliance. When using number of missed sessions as our measure, we found a significant positive relationship between adherence and years on dialysis therapy. The findings indicate there should be better targeting of younger adults in the dialysis regimen. In addition, it probably takes some time for patients to become accustomed to the regimen. The association between adherence and age also could be a result of a skewing of the patient population caused by the greater mortality rates in nonadherent patients.⁶ Interestingly, when shortened sessions are used to assess adherence, number of years on dialysis therapy correlates inversely with adherence. It is possible that people who have been on dialysis therapy longer, as a result of the many years spent living with their disease, represent a group that has a better understanding of their illness and how it affects them. They may

be able to shorten their sessions to the minimum time necessary for them to function, while still attending the required sessions to prevent morbidity and mortality.

Religion was associated with satisfaction with life in the form of intrinsic religiosity, indicating that patients with a strong internal belief system tend to be more satisfied with their lives. This was not the case for patients who scored high on the extrinsic religiosity scale, indicating that such group religious behaviors as attending church are not related to satisfaction with life.

Many other factors were related to satisfaction with life, including increased age, decreased depression, and being dialyzed on a Tuesday/Thursday/Saturday schedule. Increased satisfaction with life associated with increased age has been described.⁵⁹ As mentioned, this correlation exists when using either shortened or missed sessions as a measure of adherence.

Counterintuitively, many quality-of-life indicators increase with age in the general population in the United States.⁵⁹ This occurs even though the perception of health-related quality of life decreases with age in the general population. These data are important because they indicate that elderly sick patients can perceive themselves as enjoying a good quality of life. The reason for the difference in satisfaction with life and days of dialysis treatment is unknown. It could be caused by characteristics of the patients or even the nursing staff scheduled to work on those days, but requires more investigation.

In other studies involving dialysis patients, improved behavioral adherence and greater serum albumin levels were associated with patient perception of his or her satisfaction with the nephrologist.²⁰ This relationship did not exist for nurses and technicians. In our study, patient satisfaction with medical care was related to organized religious activity. The reason for this is unknown, but perhaps it may be caused by patients being accustomed to rules and authority. Other factors were related to patient satisfaction with care, including age and satisfaction with life. There was no relationship between satisfaction with care and adherence.

The study had a number of limitations that may have led to the negative result with respect to adherence. First, the population was primarily African American, and most patients identified them-

selves as Baptists. This makes generalization to the population at large more difficult. However, the study raises questions worthy of additional examination in more diverse populations.

Second, the sample size was relatively small and homogeneous. This limited our ability to detect differences. However, the sample accurately reflected the demographics in the 2 urban dialysis units surveyed. It should be noted that the population of patients on dialysis therapy tends to be predominantly African American and have similarities to the population reported here. Thus, a sample that is somewhat homogeneous may reflect the actual epidemiological characteristics of the disease, and our results could certainly be generalized to patients in an urban dialysis center.

A third limitation is the difficulty quantifying religious experiences with available scales. A more qualitative study of people's religious beliefs and experiences also would be useful.

Fourth, it is possible that by measuring religiosity, we are actually measuring some factor related to religion, but not religiosity itself. Thus, it may be that people who are religious have more social support or better habits than those who express no religious beliefs. We tried to control for this by measuring factors associated with religion on different scales, such as the Multidimensional Scale of Perceived Social Support.

Fifth, a possibility not explored in this report is the "center effect." This idea suggests that measures of patient outcome may be related to the extent to which the unit and staff reflect the dominant religious modes of their patient population. To answer this question likely would require the participation of a large number of HD units, and although beyond the scope of this study, is something that should be considered for additional studies.

Last, it is possible that many of these patients became more religious as a result of their disease. We believe this is an area that has not received significant attention in the literature and would like to examine this question further in a larger follow-up study that we are planning.

In conclusion, we found a number of potentially important associations between religion and medical/social variables in the dialysis population, although we could not detect an association between religious beliefs and adherence in this population. These interesting asso-

ciations included increased intrinsic religiosity and greater satisfaction with life, increased extrinsic religiosity and greater satisfaction with medical care, the relationship between older age and increased satisfaction with medical care, and older age and increased adherence. These associations reinforce the idea that religion has a role in patients with chronic illness; therefore, it is important for health care providers to understand patients' beliefs about illness and care. We recommend additional investigation of the complex nature of religion and its effect on HD patients.

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