Intercessory Prayer, Visualization, and Expectancy for Patients with Severe Illnesses:

Implications for Psychotherapy

Key Words: intercessory prayer, expectancy, positive visualization

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ABSTRACT

The purpose of this study was to explore the effect of intercessory prayer, positive visualization, and outcome expectancy on a wide range of medical and psychological measures for critically ill patients. Ninety-five adult male and female volunteer hemodialysis subjects with end-stage renal disease were randomly assigned to a 2 X 3 (expectancy X treatment) factorial design. Ten medical and 10 psychological measures were used to assess the subjects' overall well-being. The results indicated that more subjects who expected to receive intercessory prayer reported feeling significantly better than did the subjects who expected to receive positive visualization. Similarly, subjects who expected to receive positive visualization indicated a small effect size, also in favor of expectancy theory. No other statistically significant main effects or interactions were found for expectancy, intercessory prayer, or positive visualization on the remaining dependent measures. Analysis of effect sizes on all dependent measures failed to indicate even a small magnitude of effect for intercessory prayer as contrasted with expectancy on the medical or psychological variables. Therefore the effects of intercessory prayer and transpersonal positive visualization cannot be distinguished from the effect of expectancy, and thus do not appear to be effective treatment interventions. A better predictor for a patient's psychological and physiological well-being is the patient's positive expectancy that interventions such as prayer will lead to improvement.

INTRODUCTION

The practice of praying for the well-being of oneself and/or praying for the well-being of others (i.e., intercessory prayer to God) is widely accepted in religious traditions. In addition, public interest in the effectiveness of prayer in relationship to physical health has seen a resurgence over the past decade. In fact, the relationship between health, religion, and psychotherapy is an area of interest receiving much current attention. For instance, in the August 1996 *APA Monitor*, Clay reports that psychology is now taking the relationship between religion and mental health seriously, as evidenced by more psychotherapists becoming interested in spirituality and prayer. Although anecdotal reports of the effectiveness of prayer have been published, little replicable empirical evidence is available.

In a recent review, Sloan et al (1999) noted that most research on religion and well-being suffers from 1.) serious threats to internal validity, 2.) poor statistical procedures leading to type-I errors, and 3.) conflicting findings. In addition, these authors found that when relevant covariates (e.g., age, sex, education, ethnicity, socioeconomic status, degree of religiosity, etc.) were controlled, previously reported effects in favor of prayer were eliminated. The existing research on prayer has found no statistically significant effect of intercessory prayer on medical conditions in adults and children. Given this lack of empirical evidence, the notion that intercessory prayer is an effective therapeutic intervention cannot be supported. However, while prayer per se has not been shown to be effective, Green (1993) found positive expectancy in relation to intercessory prayer to have a significant effect on lowering patients' reported anxiety levels. Similarly, Matthews, Conti, and Sireci (2001) found that the effects of intercessory prayer could not be distinguished from the effect of expectancy.

From a naturalistic as opposed to a super-naturalistic perspective, what might account for patients who report feeling better as a result of intercessory or direct prayer? We would suggest that the person's personal belief system may account for the self-reported benefits of prayer. Specifically, the constructs of response expectancy, placebo, and interpersonal expectancy have been empirically demonstrated to have a significant effect on psychotherapy outcomes (Kirsch, 1985; Lambert, 1986; Rosenthal & Rubin, 1978; Rosenthal, 1956). Kirsch (1990) provides ample empirical support for the notion that the individual's response expectancy can affect not only the psychological but also the

physiological responses of the individual. Kirsch (1990) argues that if a client expects to experience a particular behavior or a particular outcome in psychotherapy, he or she is more likely to do so than if he or she were to hold a negative expectancy for change. Meta-analytic studies reveal that response expectancy can account for at least half the effectiveness of psychotherapy (Kirsch, 1990; Barker, Funk, & Houston, 1988). The empirical literature provides consistent support for the notion that psychotherapy's effects can be enhanced by attending to the therapeutic potential of clients' expectations (Kirsch, 1990; Gosselin & Matthews, 1995; Matthews, Conti & Starr, 1998). We would argue that, in effect, prayer is analogous to psychotherapy in that the individual's belief is significantly related to positive outcomes.

The purpose of the present exploratory study was 1.) to investigate the effect of intercessory prayer and transpersonal positive visualization for 95 volunteer patients with end-stage renal disease, and 2.) to assess the extent to which any effect on psychological or physiological well-being is attributable to patient expectancy or actual treatment. Ten self-report psychological measures of well-being, in addition to 10 standard physiological measures used to monitor progress for end-stage renal disease patients, served as the dependent measures in this study. Patients were either prayed for by a Christian prayer group or received transpersonal positive visualization (non-religious positive-oriented imaging directed toward the target patient's well-being) from a visualization group. Respectively, each group either prayed or visualized for the patients to improve both psychologically and medically. We hypothesized that patients who received prayer or visualization would not differ on outcome measures as compared to patients who expected to receive either prayer or positive visualization but who actually (unbeknownst to them) received neither or the opposite intervention. In addition, we hypothesized that patients who expected to be prayed for, regardless of the actual treatment received or whether no treatment was received, would report more positive outcomes on the 10 self-report psychological measures as well as the 10 physiological measures.

As noted in Figure 1, the research design was a 2 X 3 (treatment expected X treatment received) factorial design with a randomized assignment protocol in which hospital staff members were blinded to the experimental manipulations. Pre-treatment differences (e.g., age, ethnicity, socioeconomic status, and religion) were controlled for subjects in all groups.

Figure 1: *2 (Expected Treatment) X 3(Treatment Received) Factorial Design with Cell Size*

	Treatment Received			
Expected Treatment	Prayer	Positive Visualization	Nothing	
Prayer	n=15	n=15	n=17	n=47
Positive Visualization	n=16	n=16	n=6	n=48
	n=31	n=31	n=33	n=95

The experimenter informed each participant that he or she would receive either intercessory prayer (n = 47) or positive visualization (n = 48). In actuality, approximately one third of each treatment group actually received what they were told, one third of the participants (unbeknownst to them) received a different intervention from what they were told, and one third of the participants (unbeknownst to them) received neither prayer nor positive visualization. Statistical analyses indicated that subjects remembered their assigned treatment condition throughout the study.

The treatment component of the study was completed during 4 consecutive weeks. Baseline pretreatment assessment data were collected on medical and psychological dependent variables for all participants in the study during a 5-week period before the intervention, and post-test data were collected during a 2-week period following the treatment interventions. The intercessory prayer group prayed using two specific and scripted prayers. The positive visualization group visualized patients' conditions improving as guided by a specific and scripted audiotape. Respectively, both groups prayed or visualized together once a week. For purposes of standardization, each intervention occurred for a predetermined length of time at a predetermined time of day.

METHOD

Subjects

The sample consisted of 95 adult subjects randomly selected from a hemodialysis center in Miami, FL. Each patient was diagnosed with end-stage renal disease and was receiving outpatient hemodialysis treatment 3 times per week. In addition to having end-stage renal disease, selection was limited to patients who were cognitively capable of providing informed consent and those having minimum English fluency.

On average, subjects had been on dialysis for 36 months. The average age represented in the study was 49 years; 58% of the subjects were male. Approximately 74% of the sample reported never having been married or were currently divorced or separated. Sixty-eight percent of the sample population was African American, 13% were Haitian, 11% were of Cuban or other Hispanic origin, and 8% of the subjects were Caucasian. High school graduates made up 26% of the sample, while approximately 59% of subjects had not graduated from high school. College graduates or subjects who had completed post-graduate school constituted 24% of the sample. Of the entire sample, 5.3% had an annual income over $20,000, 15.8% earned $10,000 to

$20,000, and approximately 80% had an annual income of less than $10,000. Of the sample population, 66.3% were unemployed. The majority of the sample identified their religious affiliation as Protestant (71.6%) or Catholic (13.7%). Subjects with other religious affiliations constituted 10.5%, while subjects having no religious affiliation made up 4.2% of the sample. Hypertension (37.9%) was the largest single cause of end-stage renal disease in the sample population. Diabetes Type I or Type II (34.7%) and other etiologies (27.4%) of end-stage renal disease followed.

An a priori power analysis was conducted. Assuming a large effect size of 0.4 and an alpha level of 0.05, the current N = 95 yielded a minimum power rating of 0.91.

Dependent Measures

Medically based dependent variables. In this study, 10 dependent variables, based on medical outcomes regularly utilized in evaluation of end-stage renal disease patients, were used as outcome measures. The 10 medically based dependent variables included 1.) KT/V—a measure of urea clearance examining whether dialysis is removing body toxins or not where K = dialyser clearance, T = time, and V = volume distribution of urea (goal/normal outcome standard KT/V Æ 1.3, with a specific clinic goal of Æ 1.4 for non-diabetics and Æ 1.6 for diabetics); 2.) Albumin—a measure of nutrition where an increase in albumin is desirable (goal/normal outcome standard > 3.5g/dl with a specific clinic goal of Æ 4.0g/dl); 3.) Systolic blood pressure (goal/normal outcome standard pre-dialysis ≤ 140); 4.) Diastolic blood pressure (goal/normal outcome standard pre-dialysis ≤ 90); 5.) Interdialytic weight gain (where the pre- to post-weight change goal is < 5% from completion of the most previous dialysis treatment to initiation of current dialysis); 6.) Serum inorganic phosphorous (where it is desirable for this dependent measure to decrease, goal/normal outcome standard 3.5 - 5.5 mg/dl); 7.) Hematocrit—a measure of red blood cells where low hematocrit can result in anemia (goal/normal outcome standard > 32% with a clinic goal between 34% - 36%); 8.) Number of hospitalizations following initiation of study; 9.) Number of new medical problems following initiation of study; 10.) A self-report reply to the question, "Have you been feeling better, the same, or worse since the study began?" (Note: measures 8, 9, and 10 were post-test measures only).

Self-Reported Psychological Dependent Variables. Four self-report dependent measures were used in this study: 1.) SF-36 (Health Status Questionnaire, 1993); 2.) Beck's Depression Inventory (BDI) (Beck, 1978); 3.) Brief Symptom Inventory (BSI) (Derogatis, 1993); and 4.) the Belief in Prayer/Positive Visualization Questionnaire (BPPQ), developed by Dr. Conti to assess belief in the efficacy of both prayer and positive visualization. The SF-36 (Health Status Questionnaire, 1993) is a 36-item measure of quality of life assessing eight attributes of health combined within three health dimensions. Four of these eight attributes were examined in this study: 1.) general health, 2.) social function, 3.) bodily pain, and 4.) vitality. In the above categories, health is assessed within a range from zero to 100, where 100 indicates the highest level of health. Internal consistency values (coefficient alpha) for subjects range from 0.79 on mental health to 0.93 on physical functioning for the 65+ age group and from 0.75 on social functioning to 0.89 on physical functioning for the 18 to 64 age group (Radosevich, Wetzler, & Wilson, 1994).

All subjects completed the BDI (Beck, 1978). The BDI is a 21-item scale that scores depression within the following ranges: minimal (scores of 0-9), mild (scores of 10-16), moderate (scores of 17-29), and severe (scores of 30-63). The six final questions on the BDI constitute the Physical Depression Index, and were omitted secondary to all subjects in the study being diagnosed with end-stage renal disease. Therefore, the first 15 questions of the BDI, which comprise the Cognitive Depression Index (CDI), were left for interpretation. The CDI has demonstrated internal consistency with end-stage renal disease patients (coefficient alpha = 0.74) (Sachs, Peterson, & Kimmel, 1990). Test-retest reliability on the BDI was greater than 0.90 in a sample of 38 patients. (Peterson, Kimmel, Sacks, Mesquita, Simmens, & Reiss, 1991)[1]. The respondent can easily understand what the instrument is assessing due to the scale's strong face validity, which may be a disadvantage of this test.

The BSI (Derogatis, 1993) is a 53-item self-report symptom inventory showing the psychological symptom patterns of psychiatric and medical patients in addition to non-patient respondents from the community. Patients rate each self-report item on a zero to four Likert scale from "not at all likely" to "extremely likely." Although the BSI consists of nine primary symptom dimensions in total, the following five dimensions were used in this study: 1.) Somatization (SOM), 2.) Depression (DEP), 3.) Anxiety (ANX), and 4.) Hostility (HOS). Similarly, the BSI has three global indices, although only the Global Severity Index (GSI) was analyzed. The BSI has been shown to have a strong construct and predictive validity and strong concurrent validity with the MMPI. (Derogatis, 1993).

Developed specifically for this study was a 17-item Belief In Prayer/Positive Visualization Questionnaire with three subscales: 1.) Belief in Prayer, 2.) Belief in Positive Visualization, and 3.) Level of Spirituality and Religiosity. The Belief in Prayer subscale consisted of five items rated on a seven-point Likert scale. Subjects were asked to respond (1 = strongly agree to 7 = strongly dis-

agree) to items such as "I believe that God will answer the prayers about my health from people who are unknown to me, as He would answer my own prayers," and "I believe that having someone pray for me will be of benefit to me." The Belief in Visualization scale consisted of five Likert scale items where subjects were asked to respond (1 = strongly agree to 7 = strongly disagree) to items such as "I believe that the positive visualization regarding my health by people who are unknown to me is as effective as my own self-positive visualization," and "I believe that having someone visualize my positive well-being will be of benefit to me." The Level of Spirituality and Religiosity subscale sought to assess a general level of spiritual belief in the research participants and consisted of seven Likert scale items. Subjects were instructed to respond, using the same seven-point Likert scale, to items such as "God/my Higher Power is a source of peace and strength for me," and "I consider myself to be a religious and/or spiritual person."

RESULTS

Randomization of the 95 participants to treatment conditions resulted in 47 subjects who expected to receive intercessory prayer and 48 subjects who expected to receive positive visualization. In actuality, 31 subjects received intercessory prayer, 31 subjects received positive visualization, and 33 subjects received neither intercessory prayer nor positive visualization (see Figure 1 for exact cell size).

Integrity of Experimental Manipulation

The 95 subjects were reminded of the treatment condition to which they were randomized after 2 weeks of the experiment were completed. The subjects were assessed after 4 weeks of experimental manipulation to determine whether they actually remembered the condition to which they had been assigned. A coefficient of contingency demonstrated that subjects significantly retained their initial treatment expectation ($C = 0.53$, $P < 0.001$). The double-blind nature of this study was also confirmed through post-study questioning of the hemodialysis unit staff. The medical director and all staff in contact with the subjects indicated that they remained uninformed about the treatment condition assigned to subjects.

Belief in Treatment Condition's Effectiveness

There was an overall internal consistency coefficient (coefficient alpha) of 0.84 for the Belief in Prayer/Positive Visualization Questionnaire. There was an alpha coefficient of 0.78 for the Belief in Prayer subscale. The Level of Spirituality subscale had an alpha coefficient of 0.81 and the Belief in Positive Visualization subscale had an alpha coefficient of 0.74.

Subjects scoring in the lower third of the scale seemed to have only a moderate level of belief that either positive visualization or prayer would be of specific benefit to them as related to their particular medical condition. Hence, for the Belief in Positive Visualization subscale, $X = 12.72$, $sd = 5.76$. For the Belief in Prayer subscale, subjects had mean scores of $X = 9.67$, $sd = 5.97$; while for the Level of Spirituality subscale, $X = 14.68$, $sd = 8.27$. Note that scores on the three subscales ranged from a low of 7 to a high of 35. As a function of assigned treatment conditions, no statistically significant differences were found between the scores on the three subscales. It should be noted that the Belief in Prayer/Positive Visualization Questionnaire was developed for use in this study. There are no data on the beliefs of non-patients in regard to intercessory prayer, positive visualization, or level of spirituality with which to compare the participants of this study.

Integrity of Treatment

Intercessors, using daily self-report logs to record task completion, indicated that they completed 98% of the total prayer sessions requested for this study. Similarly, positive visualizers, using daily self-report logs to record task completion, indicated that they completed 91% of the positive visualization sessions requested for this study.

Hospitalizations, New Medical Problems, Feeling Better. Regarding new hospitalizations since the study began, a chi-square analysis failed to demonstrate a significant observed difference between expectancy conditions ($X^2 = 0.01$, $df = 1$) and treatment conditions ($X^2 = 0.08$, $df = 2$). A chi-square analysis also failed to demonstrate any significant observed differences between expectancy conditions ($X^2 = 0.08$, $df = 1$) and treatment conditions ($X^2 = 0.01$, $df = 1$) in the number of new medical problems since inception of the study[2]. At the conclusion of the interventions, subjects were asked whether they felt the same, better, or worse (1 = better, 2 = same, and 3 = worse) since the study began. A 2 X 3 (expectancy X treatment) ANOVA indicated a significant main effect for expectancy ($F = 5.42$, $df = 1$, $93p < 0.02$). Therefore, subjects who expected to receive intercessory prayer ($\underline{X}_{\text{Eintercessory prayer}} = 0.42$, $sd = 0.58$) reported feeling better than subjects expecting to receive positive visualization ($\underline{X}_{\text{Epositive visualization}} = 1.69$, $sd = 0.66$). There was a moderate effect size for this mean difference ($ES = 0.56$).

ANCOVA for Medical Dependent Measures. Tests performed for measures of central tendency and homogeneity of variance indicated no violations of the underlying assumptions of the parametric analyses employed. All of the seven dependent medical measures were analyzed in a 2 X 3 (treatment condition X expectancy condition) ANCOVA. The covariates consisted of the pretreatment assessments of each of the seven dependent medical measures examined. The adjusted means and standard deviations for each of the medical dependent variables are presented in Table 1.

Table 1: *Means and Standard Deviations (in parentheses) for Expectancy and Treatment Conditions for Medical Variables*

	Treatment Received (collapsed across expectancy)			Treatment Expected (collapsed across treatment received)	
Independent Variable	int. prayer	positive vis.	no treatment	intercessory prayer	positive visualization
Diastolic BP (40 BP goal)	85.60 (13.71) n = 31	77.26 (12.26) n = 31	84.12 (13.05) n = 33	82.23 (13.10) n = 47	82.46 (13.78) n = 48
Systolic BP (140 BP goal)	150.68 (23.04) n = 31	141.77 (20.21) n = 31	142.62 (18.00) n = 33	141.49 (21.00) n = 47	148.40 (19.90) n = 48
Phosphorous level (lower score desired)	5.23 (1.96) n = 30	5.51 (1.45) n = 31	5.64 (1.30) n = 32	5.10 (1.57) n = 47	5.80 (1.53) n = 46
KT/V (›1.4 goal) increase desired	1.50 (.20) n = 27	1.56 (.34) n = 20	1.44 (.33) n = 26	1.47 (.30) n = 36	1.52 (.29) n = 37**
Albumin (4.0g/dl goal) increase desired	4.31 (.41) n = 30	4.15 (.47) n = 31	4.42 (.42) n = 32	4.30 (.41) n = 47	4.29 (.49) n = 46
Interdialytic weight gain (decrease desired)	2.52 (1.57) n = 30	2.56 (1.25) n = 26	2.53 (1.47) n = 27	2.59 (1.20) n = 43	2.47 (1.65) n = 40**
Hematocrit (34%-36% goal) increase desired	33.86 (3.04) n = 30	31.23 (4.81) n = 31	34.27 (3.76) n = 32	33.33 (3.89) n = 47	32.91 (4.40) n = 46

***Total number of subjects varied in some instances due to the medical conditions of some subjects who were not available at the time of data collection.*

Table 2: *Means and Standard Deviations (in parentheses) for Expectancy and Treatment Conditions for Psychological Variables*

	Treatment Received			Treatment Expected	
Independent Variable	int. prayer	positive vis.	no treatment	intercessory prayer	positive visualization
SF-36 bodily pain (high score desired)	7.37 (2.8) n = 30	8.10 (2.50) n = 31	8.70 (2.84) n = 32	7.70 (2.45) n = 47	8.45 (3.00) n = 46
SF-36 vitality (high score desired)	14.93 (4.72) n = 30	14.74 (4.36) n = 31	15.47 (5.10) n = 32	15.49 (4.36) n = 47	14.61 (5.01) n = 46
SF-36 social function (high score desired)	8.37 (1.87) n = 30	7.839 (1.66) n = 31	7.44 (2.02) n = 32	8.02 (1.78) n = 47	7.72 (1.97) n = 46
SF-36 general health (high score desired)	14.17 (3.94) n = 28	15.20 (27) n = 30	15.19 (5.10) n = 32	14.90 (4.36) n = 47	14.85 (4.62) n = 43
BDI-cognitive (low score desired)	5.64 (4.64) n = 31	4.39 (4.78) n = 31	4.82 (4.98) n = 33	5.66 (5.13) n = 47	4.25 (4.09) n = 48
BSI-somatic (low score desired)	55.90 (10.32) n = 30	55.73 (10.95) n = 30	56.34 (12.62) n = 32	56.53 (12.20) n = 47	55.44 (10.25) n = 45
BSI-depression (high score desired)	56.53 (11.25) n = 30	53.67 (11.57) n = 30	53.53 (10.06) n = 32	56.36 (10.93) n = 47	52.67 (10.72) n = 45
BSI-anxiety (low score desired)	49.10 (9.87) n = 30	50.30 (1.14) n = 30	49.28 (11.41) n = 32	52.30 (1.13) n = 47	46.69 (9.61) n = 45
BSI-hostility (low score desired)	48.43 (10.25) n = 30	51.00 (9.62) n = 30	50.36 (11.51) n = 32	51.57 (10.64) n = 47	48.24 (10.25) n = 45
BSI-global severity index (low score dsired)	53.93 (10.72) n = 30	52.87 (11.78) n = 30	51.41 (12.81) n = 32	54.21 (12.64) n = 47	51.13 (10.72) n = 45

Due to multiple analyses being performed, the experiment-wise alpha level of $p < 0.05$ was adjusted using a Bonferroni correction procedure to control for Type-I error. The resulting error rate comparison alpha level was set at $p < 0.003$. This stringent alpha level, as expected, resulted in no statistically significant main effects or interactions on the medical measures used for either the expectancy or treatment conditions. Conversely, with the alpha level reduced to control for Type-I error, the probability of Type-II error increased significantly. As a result, the highest observed power was less than 0.4 in this study.

ANCOVA for Self-Report Psychological Dependent Measures. As was discussed in the methods section, a total of 10 self-report dependent measures were analyzed. The adjusted means and standard deviations for these psychological dependent measures are presented in Table 2. Again, the stringent alpha level resulted in no statistically significant main effects or interactions on any of the psychologically based dependent measures for either the expectancy or treatment conditions.

Effect Size

An effect-size measure provides a counterbalance to statistically significant findings of trivial importance attributable to both a large sample size and to the possibility of Type-II error due to low statistical power. For that reason, an effect-size analysis was completed to examine the effects of intercessory prayer, positive visualization, and expectancy on every dependent measure. Effect sizes were computed by dividing the relevant treatment means by the omnibus standard deviation (i.e. standardized mean difference effect size)[3]. Standardized mean effect sizes of 0.20, 0.50, and 0.80 are considered by Cohen (1969) to be small, medium, and large effect sizes, respectively.

Effect size for treatment comparisons. A basic question of this study sought to ascertain if subjects who received intercessory prayer had a beneficial effect on either the medically based and/or psychologically based dependent measures in comparison to those subjects who received positive visualization or no treatment. Three effect-size contrasts for treatment actually received were calculated for each dependent measure: 1.) received intercessory prayer vs. received no treatment; 2.) received intercessory prayer vs. received positive visualization; and 3.) received positive visualization vs. received no treatment. At least a small positive effect size for the first and second contrasts would theoretically be expected if intercessory prayer had an effect on these outcome measures. Similarly, if positive visualization had an effect, at least a small positive effect size for the third contrast could be hypothesized. Table 3 (medical measures) and Table 4 (psychological measures) provide the effect sizes for these contrasts.

As evident in both Table 3 and Table 4, while there were a wide range of

Table 3: *Effect Sizes for Treatment Contrasts for Medical Variables*

Independent variable	Effect size for received int. prayer vs. received no treatment $\frac{X_{R\text{intercessory prayer}} = X_{R\text{no treatment}}}{\text{pooled sd}}$	Effect size for received int. prayer vs. received pos. visualization $\frac{X_{R\text{intercessory prayer}} = X_{R\text{pos. visualization}}}{\text{pooled sd}}$	Effect size for received pos. visualization vs. received no treatment $\frac{X_{R\text{pos. visualization}} = X_{R\text{no treatment}}}{\text{pooled sd}}$
Diastolic BP	ES = -0.11	ES = -0.64	ES = -0.52
Systolic BP	ES = -0.41	ES = -0.45	ES = 0.04
Phosphorous level	ES = -0.31	ES = -0.21	ES = -0.10
KT/V	ES = 0.75	ES = -0.75	ES = 1.50
Albumin	ES = -0.33	ES = 0.48	ES = -0.82
Interdialytic weight gain	ES = 0.01	ES = 0.03	ES = -0.02
Hematocrit	ES = -0.11	ES = 0.71	ES = -0.82
Mean effect size	$\underline{X}$ = -0.08	$\underline{X}$ = -0.12	$\underline{X}$ = -0.11
Range	-0.41 to 0.75	-0.75 to 0.71	-0.82 to 1.50

Table 4: *Effect Sizes for Treatment Contrasts for Psychological Variables*

Independent variable	Effect size for received int. prayer vs. received no treatment $\frac{X_{E\text{pos. visualization}} = X_{T\text{pos. visualization}}}{\text{pooled sd}}$	Effect size for received int. prayer vs. received pos. visualization $\frac{X_{E\text{intercessory prayer}} = X_{T\text{pos. visualization}}}{\text{pooled sd}}$	Effect size for received pos. visualization vs. received no treatment $\frac{X_{\text{intercessory prayer}} = X_{\text{no treatment}}}{\text{pooled sd}}$
BSI-somatic	ES = 0.05	ES = -0.02	ES = 0.06
BSI-depression	ES = 0.13	ES = -0.06	ES = -0.07
BSI-anxiety	ES = 0.02	ES = 0.14	ES = -0.12
BSI-hostility	ES = 0.20	ES = 0.20	ES = -0.07
SF-36 bodily pain	ES = -0.52	ES = -0.29	ES = 0.24
SF-36 vitality	ES = -0.14	ES = 0.05	ES = -0.19
SF-36 general health	ES = -0.31	ES = -0.32	ES = 0.01
SF-36 social function	ES = 0.50	ES = 0.29	ES = 0.22
BDI-cog	ES = -0.24	ES = -0.38	ES = 0.13
BSI-global severity index	ES = -0.28	ES = -0.28	ES = -0.16
Mean effect size	$\underline{X}$ = -0.06	$\underline{X}$ = -0.07	$\underline{X}$ = 0.01
Range	-0.52 to 0.50	-0.38 to 0.29	-0.16 to 0.24

effect sizes (i.e., -0.82 to 1.50), the mean effect size for each of the computed treatment contrasts did not indicate even a small effect for intercessory prayer or positive visualization when compared to each other or when compared to those subjects who received no treatment at all. As such, these effect-size data support the hypothesis of no treatment effect for subjects who received intercessory prayer or positive visualization when compared to subjects who received no treatment.

Effect size for expectancy comparisons. As well as comparing effects of treatment, an important component of this study was to determine the effects of expectancy on the dependent measures. Therefore, on each of the dependent measures, three effect-size contrasts for expectancy were computed. The effect-size contrasts were 1.) expected and received intercessory prayer vs. expected and not received intercessory prayer, 2.) expected and received positive visualization vs. expected and not received positive visualization, and 3.) expected intercessory prayer vs. expected positive visualization.

As noted in Table 5 (expectancy contrast for medical variables), the mean effect size for the first contrast failed to demonstrate a notable effect size for subjects who expected and received intercessory prayer as compared to subjects who expected intercessory prayer but did not receive it. Also on the medical dependent measures, the second and third comparison contrasts failed to indicate any significant effect sizes.

As noted in Table 6 (expectancy contrasts for the psychological variables), there were no significant effect sizes considering the overall mean effect contrast for the first and second comparisons. The third comparison contrast, however, indicated a small effect size for those subjects who expected to receive positive visualization vs. those subjects who expected to receive intercessory prayer. Other than this specific contrast, at least partial support can be given to the overall hypothesis that subjects who expected to receive intercessory prayer would signify a greater response on the dependent measures than those subjects who did in fact receive intercessory prayer.

DISCUSSION

Overall, the data from this study with these particular subjects suffering from end-stage renal disease did not support the efficacy of intercessory prayer or transpersonal positive visualization as a treatment intervention. We did find some tentative support for the effect of patient expectancy and prayer. Specifically, subjects who expected to receive intercessory prayer (regardless of what they actually received) reported feeling significantly better than did subjects who expected to receive positive visualization. However, a series of 2 X 3 (expectancy X treatment) ANCOVA analyses revealed no significant main effects for expectancy or treatment on any of the remaining 9 medical or 10 psychological dependent variables used in this study. However, the actual observed power indicated the high (> 0.6) likelihood of a Type-II error (i.e., failing to find an actual difference). As an alternate method of data interpretation, the mean difference effect-size statistic was used to consider the magnitude of the effect of each experimental condition in contrast to a comparative condition. The data failed to indicate even a small effect on either the psychological or the medical variables for those subjects who expected and

Table 5: *Effect Sizes for Expectancy Contrasts for Medical Variables*

Independent variable	Effect size for expected/received int. prayer vs. expected/not received int. prayer $\underline{X}_{ER}$ intercessory prayer = $\underline{X}_{ENR}$ intercessory prayer pooled sd	Effect size for expected/received pos. visualization vs. expected/not received pos. visualization $\underline{X}_{E/R}$ pos. visualization = $\underline{X}_{E/NR}$ pos. visualization pooled sd	Effect size for expected int. prayer vs. expected pos. visualization $\underline{X}_{E}$ intercessory prayer = $\underline{X}_{E}$ pos. visualization pooled sd
Diastolic BP	ES = -0.20	ES = -0.53	ES = 0.02
Systolic BP	ES = -0.56	ES = -0.30	ES = 0.35
Phosphorous level	ES = 0.58	ES = 0.05	ES = -0.55
KT/V	ES = -1.25	ES = 1.50	ES = -0.63
Albumin	ES = 0.18	ES = -0.06	ES = 0.03
Interdialytic weight gain	ES = -0.15	ES = 0.18	ES = 0.10
Hematocrit	ES = 0.50	ES = 0.09	ES = 0.11
Mean effect size	$\underline{X}$ = -0.13	$\underline{X}$ = 0.13	$\underline{X}$ = -0.08
Range	-1.25 to 0.58	-0.53 to 1.50	-0.63 to 0.35

Table 6: *Effect Size for Expectancy Contrasts for Psychological Variables*

Independent variable	Effect size for expected/received int. prayer vs. expected/not received int. prayer $\underline{X}_{ER}$ intercessory prayer = $\underline{X}_{ENR}$ intercessory prayer pooled sd	Effect size for expected/received pos. visualization vs. expected/not received pos. visualization $\underline{X}_{E/R}$ pos. visualization = $\underline{X}_{E/NR}$ pos. visualization pooled sd	Effect size for expected int. prayer vs. expected pos. visualization $\underline{X}_{E}$ intercessory prayer = $\underline{X}_{E}$ pos. visualization pooled sd
SF-36 bodily pain	ES = -0.36	ES = -0.29	ES = -0.29
SF-36 vitality	ES = 0.55	ES = 0.01	ES = 0.23
SF-36 general health	ES = -0.11	ES = -0.08	ES = 0.02
SF-36 social function	ES = 0.62	ES = 0.39	ES = 0.16
BDI-cog	ES = -0.23	ES = -0.41	ES = -0.41
BSI-somatic	ES = 0.27	ES = 0.26	ES = -0.11
BSI-depression	ES = 0.00	ES = 0.25	ES = -0.45
BSI-anxiety	ES = 0.19	ES = -0.06	ES = -0.67
BSI-hostility	ES = 0.25	ES = -0.35	ES = -0.34
BSI-global severity index	ES = 0.12	ES = 0.08	ES = -0.34
Mean effect size	$\underline{X}$ = 0.13	$\underline{X}$ = 0.02	$\underline{X}$ = -0.22
Range	-0.36 to 0.62	-0.41 to 0.39	-0.67 to 0.23

received intercessory prayer as compared to those subjects who expected to but did not receive intercessory prayer, as would be predicted for intercessory prayer. In addition, the data revealed a small mean effect size (E.S. = -0.22) for subjects who expected positive visualization in comparison to subjects who expected intercessory prayer on the 10 psychological variables employed in this study. Importantly, the effect of intercessory prayer or positive visualization could not be distinguished from the effect of expectancy.

The findings from this study are consistent with the previous intercessory prayer research and the current empirical literature on expectancy effects for both psychological and physiological responding (Green, 1993; Kirsch, 1990; Worth, 1995). In the current study, the effect sizes noted favored expectancy theory. Those who expected to be prayed for (versus visualized for) felt significantly better at the end of the study. Similarly, subjects who expected to receive positive visualization indicated a small effect size also in favor of expectancy theory.

Given these data, and results from previous research, having positive expectancy with regard to a desired outcome (e.g., lowering anxiety, reducing depression, increasing a positive sense of well-being, etc.) is likely to be a useful construct for psychotherapy patients.

How might patients' expectations be utilized or encouraged to foster a generalized feeling of well-being or to meet other treatment goals? It is likely to benefit the patient if negative expectations (e.g. "I can't improve," or "I will never be happy") are altered in order to develop a more productive expectation for therapeutic success. Challenging these self-defeating expectations is a strategy incorporating expectancy theory into a cognitive behavioral therapeutic frame to create positive expectancy for psychological and physiological well-being. The effective clinician employs every opportunity to transform negative client expectations in order to optimize beneficial effects of patient expectancy.

Based upon the expectancy literature, the psychotherapist must utilize patients' expectations to positively affect therapeutic progress both psychologically as well as physically. The therapeutic issue is to strategically utilize the patient's existing beliefs to develop a positive expectancy for a desired outcome. For instance, if a patient has the belief that he or she will improve medically, the therapist might support that expectation, which may in fact bring the patient a sense of peacefulness that ultimately improves his or her perceived quality of life, even in the midst of a life-threatening illness. If a terminally ill patient believes that prayer is helpful, the clinician ought not intervene with a discussion of the empirical evidence that prayer has not been scientifically proven to be helpful. Instead, the clinician ought to encourage the patient's positive expectations toward his or her own well-being.

While the empirical research does not support the efficacy of prayer, it does, however, support the notion of positive expectancy. Therefore, a better predictor for patients' psychological and physiological well-being is the patient's positive expectancy that interventions such as prayer will lead to improvement.

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FOOTNOTES

1.Peterson, Kimmel, Sacks, Mesquita, Simmens, and Reiss (1991) suggest that for "medical patients, the CDI might be a better predictor of depression because of a reduction in the confound due to symptoms of physical illness which are similar to symptoms of depression" (p. 346).

2. A chi-square analysis was used because 'hospitalizations' and 'new medical problems' were reported as categorical variables (i.e. yes/no).

3. Effect size was calculated using the formula presented in Table 2. The pooled standard deviation was used as recommended by Olejnik and Algina (in press).

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