Effectiveness of a Social Work Psychoeducational Program in Improving Adherence Behavior Associated with Risk of CVD in ESRD Patients

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The study reported in this article—the 2000-2001 Council of Nephrology Social Workers research project—demonstrated some significant outcomes indicating the importance of the nephrology social worker in impacting positive treatment outcomes on the renal team. A cognitive-behavioral intervention administered by the social workers, with psychoeducational components, was found to significantly improve levels of physical activity, medication compliance, and treatment attendance. The study was conducted between 20 hemodialysis centers within Fresenius Medical Care in Dallas and San Diego using an experimental design.

Introduction

In the United States, more than 300,000 people require dialysis or a kidney transplant in order to stay alive. Approximately 90,000 new patients begin renal therapy in a given year. It is estimated that by 2010, more than 660,000 Americans will have kidney failure (Robinson, 2001).

Beginning in 1976 (Federal Register, 1976), federal regulations have required social work participation in all dialysis units. Since the inception of these services, professional social workers (trained at the master's level) have developed a variety of programs to address the myriad psychosocial and physical needs of dialysis patients. Since cure is not a realistic goal for patients who have End Stage Renal Disease (ESRD), maximizing patients' functioning and well-being have become primary objectives of care (Kutner, Curtin, Oberley, & Sacksteder, 1997). Social workers (MSWs) are trained to provide diagnostic, educational, preventive, and treatment services for individuals, groups, and families as they deal with the challenges of ESRD (Callahan, 1998). In the current economy of managed care and cost containment, social workers are particularly compelled to evaluate their professional activities and interventions on behalf of their patients.

The research described in this article examines, through systematic outcome assessment, the effectiveness of a psychoeducational intervention aimed at educating and improving adherence for patients on hemodialysis. The particular focus of the educational efforts is on cardiovascular disease (CVD) and its prominence in the life of the End Stage Renal Disease patient.

Cardiovascular Disease and End Stage Renal Disease

Richard Bright first noted the linkage between kidney disease and hypertension in the early 19th century, but it is only in the last few decades that the recognition of this relationship has been verified with empirical research (Porush, 1996). While the prevalence of hypertension varies from study to study and ranges from 50% to 87% (Bergstrom, 1988) – Cambi, Menta, Castiglioni, Bobo, Ferrari, et al. (1987) reported between 80% to 85% incidence of hypertension; Cheigh, Milite, Sullivan, Rubin, & Stenzel (1992) reported over 50%; Mittal, Kowalski, Trenkle, McDonough, Halinski, et al. (1999) reported 76%; Raine, Margreiter, Brunner, Ehrlich, Greelings, et al. (1992) reported 70%; Ritz, Strump, Katz, Wing, & Quellhorst (1983) 66% to 87%; Salem, (1995) reported 72%; Vendemia & D'Amico (1988) reported 80% to 85% – the impact of these findings is profound. Cardiovascular disease is now the major cause of death in patients with ESRD (Aronoff, 2001; Foley, Parfrey, Harnett, Kent, Murray, et al. 1996; Levey, Coronado, Foley, Mailloux, Parfrey, et al. 1998; Mailloux, Bellucci, Napolitano, & Mossey, 1994;

This research was funded through the National Kidney Foundation, Council of Nephrology Social Workers – Grant Recipients 2000-2001.

Mazzuchi, Carbonell, Fernandez, & Cean, 2000; USRDS, 1996) and has reached epidemic proportions according to the National Kidney Foundation Task Force (1998). It is the second leading cause of kidney failure in the general ESRD population and number one among African Americans (FPO, 2001). Scribner (1998), a pioneer in the field of nephrology, noted that "the most effective way to prevent or stop the progression of cardiovascular disease in patients with chronic renal disease is to cure the hypertension that develops in more than 90% of these patients" (p. 702).

Many believe that there are reversible risk factors that could significantly impact the incidence and severity of CVD in ESRD patients (Adler, 2000, Aronoff, 2001; Foley, et al. 1996; FPO, 2001; Kawamura, Fikimoto, Hisanaga, Yamamoto, & Eto, 1998; Levey, et al. 1998; Scribner, 1998; Verdecchia, Schillaci, Massimo, Gatteschi, Benemio, et al. 1990). The research reported in this article seeks to find the extent to which psychoeducational interventions in hemodialysis patients can reverse or modify risk factors related to hypertension and cardiovascular disease. The use of an educational video, prepared materials for patients and families, and brief follow-up procedures administered by master's-level nephrology social workers, supported the intervention.

Education and ESRD

What is the role of education in the course of ESRD? Does patient education make a difference? Increasing evidence points to the benefit of both on-going and early educational intervention. Kidney disease education impacts morbidity and mortality and lowers stress for the patient. This potentially impacts the degree and cost of care for the patient, facility, and government; it may also lower the stress rate for both patients and their families (Robinson, 2001). Early intervention through patient education is shown by a number of studies to be a key factor in the outcomes of ESRD patients. A sample of studies supports this assertion.

In a study by Ragson (1993), differences in employment rates were seen in patients who received education about their disease and their treatment. Brantley et al. (1990) initiated a behavioral educational program concerning care of patient vascular access sites. Findings strongly suggested that behavioral education and intervention resulted in greater patient compliance in care procedures. Bergstrom et al. (1999) found that an educational intervention "demonstrated improvements in physical activity, mental well-being, and nutritional awareness" (p. 43).

The challenge of providing client education in the nephrology setting is considerable. It is influenced by the overload of medical information for the patient and family member(s), the difficult and ever-changing regimen of treatment, and the possibility of cognitive impairment. In addition, the patient is distracted by multiple disease management challenges such as lifestyle adjustments, changes in social relationships, problems with body image, and sexual performance (Campbell, 2001). Within these realities, patients and their families seem receptive to the idea of educational intervention. The 1997 survey of over 3,600 patients by the American Association of Kidney Patients showed that patients are eager and willing to be involved in their health care; based on this survey, the AAKP has developed a strong pre-dialysis education initiative (Robinson, 2001).

Modifiable Risk Factors

Control of Blood Pressure

Under normal circumstances, the kidney plays a major function in the management of blood pressure through regulation of salt and other fluids in the body and the production of certain hormones. For ESRD patients this regulatory function does not exist and blood pressure control must be externally imposed through adherence with prescribed fluid control, medications, and dialysis treatment time, among other things. Blood pressure control is a major challenge for those maintained by hemodialysis and is a central concern for the health care provider because of the high rate of deaths due to cardiovascular disease (Aronoff, 2001; DeGoulet, Legrain, Reach, Aime, Devries, et al. 1982; Fernandez, Carbonell, Mazzucchi, & Petrucelli, 1992; Foley et al., 1996; Kawamura et al., 1998; Kowalski, Mittal, Trenkle, McDonough, Halinski, et al., 1997; Levey et al., 1998; Mazzuchi et al., 2000; Ruz & Koch, 1993; Salem, 1999; Schneider, Friend, Whitaker, & Wadha, 1992). One approach to management of blood pressure is through patient counseling and education (Dhakal, Sloand, & Schiff, 2000).

Exercise/Physical Activity

More than half of the adult population in the United States is sedentary or inactive. This physically inactive lifestyle is associated with twice the risk of developing coronary artery disease. Even a minimal exercise

program will favorably modify risk factors for heart and blood pressure problems (Miller et al., 1999). There is a growing body of evidence concerning the benefits of exercise for dialysis patients (Life Options, 1999; Miller, Fletcher, & Balady, 1999; Painter, 1994; Painter, Stewart, & Carey, 1999; Stivers, 1996). The benefits of a dialysis-based exercise program include a decrease in hypertension and cramps, an increase in hematocrit, and better weight control, improved endurance, and increased bone mass (Life Options, 1999; Miller et al., 1997; Stugart & Weiss, 1999). For most people on dialysis, exercise carries less risk than inactivity, and there are potential benefits from even minimal exercise (Painter, Stewart, & Carey, 1999; Storer, 1999).

Social Support Needs/Prevention of Depression/Stress Management

The role of social support and the prevention of depression in ESRD patients has been found to be crucial in patient adjustment, adherence, and treatment effectiveness (Abramson, Berger, Krumholz, & Vaccarino, 2001; Devins, Mann, Mandin, Paul, Hons, et al., 1990; Kimmel, Peterson, Weihs, Simmens, Boyle, Verne, et al., 1995; Kimmel, Peterson, Weihs, Simmens, Boyle, Verne, et al., 1998; Kimmel, Peterson, Weihs, Simmens, Alleyne, et al., 2001; Hitchcock, Phillip, Brantley, & McKnight, 1992; Moran, Christensen, & Lawton, 1997; Pennix, Beekman, Honig, Deeg, Schoevers, et al., 2001; Peterson, Kimmel, Sacks, Mesquita, Simmens, et al., 1991; O'Brien, 1990). Psychosocial variables and patient perceptions of their well-being are core factors in compliance and adjustment to the multitude of restrictions imposed by this chronic illness (Kimmel et al., 1998; Bremer et al., 1995). Additionally, depression is correlated with CVD outcomes in the medical literature and, thus, attention to depression as a potentially modifiable risk factor in the ESRD patient has been called for in the 1998 NKF/CVD Task Force report (Levey et al., 1998).

Stress has also been linked to cardiovascular disease. Studies have shown that stress management is associated with reductions in blood pressure (Linden et al., 2001). When stress, social support, and depression are linked together in the cardiac literature, they are equal to a major risk factor (Rozanski, Blumenthal, & Kaplan, 1999).

Adherence to Treatment

For renal patients, complying with the medical regimen means adherence to the recommendations and restrictions of the medical team in order to stabilize and survive their loss of kidney function. Non-adherence inevitably arises in the ESRD population, as the treatment regimen is complex and challenging to the patient's lifestyle (Strelzer & Hassel, 1989). The long-term survival of the ESRD patient depends on fluid control, adherence to dietary recommendations, regular dosages of multiple medications, and adherence to the dialysis prescription (Bremer et al., 1995; Brown, 1979). The frequency of non-adherence varies from 2% to 50% depending on how one defines it: skipping treatment, shortening treatment, interdialytic weight gain, or maintenance of recommended serum-phosphate levels (Held, Port, Wolfe, Stannard, Daugirdas, et al., 1996; Ifudu et al., 1995; Kimmel et al., 1995; Leggat et al., 1998; Sherman et al., 1994; Rocco & Burkart, 1993). In each of these areas, non-adherence with the medical treatment regimen is associated with a significantly higher risk of death, and the consequences of non-compliance are costly both medically and financially.

Strategies to improve adherence encompass a multidimensional approach that stresses education of patients about their medical condition and its management (DiTusa, Luzier, Jarosz, Snyder, & Izzo, 2001; Rocco & Burkart, 1993). Modification of non-adherent behavior requires direct intervention with a greater emphasis on patient understanding of the impact of behavior on treatment outcomes (Bremer et al., 1995; Sherman, Cody, Matera, Rogers, & Solachiak, 1994). The research described in this article focused on a psychoeducational intervention aimed at educating and providing behavioral training to ESRD patients and their families to improve medication and dialysis treatment adherence, as well as reduce other cardiovascular disease risk factors.

Method

Using a quasi-experimental design, study participants were recruited from centers in San Diego and Dallas, each with multiple sites, allowing for a large sample base. Within each city, sites were divided with half of the sites receiving the intervention and half not. In total, there were 11 intervention sites totaling 191 patients and 9 control sites with 171 patients. Some effort was directed toward matching sites in each city along socioeconomic and racial lines. The medical directors of each intervention site approved the intervention for all patients eligible for the intervention. Patients eligible for participation had to have been on dialysis at least six months and had not been hospitalized more than three

consecutive days. This sample formed the experimental group who received the psychoeducational intervention in addition to standard education as provided by the renal team social workers and staff. The control group, formed from patients at clinics not receiving the intervention, received standard education provided by social workers and the renal team.

Demographic information was gathered for all study participants. Institutional review was obtained at both the university — where the co-principal investigators are employed — and the dialysis center level. Informed consent was obtained from each patient, in both the experimental and control groups. Confidentiality was assured by assignment of a number for each subject, kept in confidence from the co-principal investigators.
The psychoeducational behavioral intervention, as administered by the master's-level social workers, had three components. The first component was designed to help the target population understand the modifiable CVD risk factors. The second component was designed to help patients assess how their day-to-day health behaviors impact these risk factors. The third component of the intervention was designed to provide behavioral training to individually shape lifestyle and adherence behaviors that have been documented to reduce these risk factors. The intervention was developed and standardized through training in both the Dallas and San Diego sites provided to the staff social workers by a nephrology social worker study consultant. The intervention instrument was pilot tested in both sites and modifications were made in both content and length.

The design of the project called for each patient within the intervention group to participate in a 45- to 60-minute training session consisting of a 9-minute video prepared by a social work study consultant and presented by a nephrologist. The video involved a discussion about the risk of hypertension in dialysis patients and its impact on cardiovascular disease. Following the video, the MSW administered the psychoeducational and behavioral components of the intervention that were designed as a flipchart accompanied by handouts. The patient's significant other(s) were encouraged to participate in the training if available. The intervention was delivered in either an individual or small group format with other patients. It was usually delivered either during or immediately before or after a dialysis treatment. The majority of patients participated in the training on their own. Each patient was invited to think about their personal "wellness plan" during the intervention and to consider "things that could get in the way" of controlling their blood pressure such as physical inactivity and emotional distress. Behavioral support was provided throughout the intervention to provide wellness skills and motivate improved health behaviors. At the end of the intervention, patients were encouraged to monitor their behavior in nine areas of risk.

The educational and behavioral material was developed by Intervention Design Consultant, Stephanie Johnstone, LCSW, and was presented to all intervention patients by the renal staff MSWs. Brief follow-up provided by the MSW was part of the study protocol. All patients in these dialysis centers were monitored via computer for a broad array of physical indicators. For the purposes of the study, several data areas in particular were analyzed. Both the intervention and control groups were monitored for average monthly interdialytic weight gain, length and duration of average monthly treatments, and average pre-dialysis sitting blood pressure. Computer-generated data was collected and recorded for all patients in the intervention group at baseline (30 days before the intervention) and at +30, +60, and +90 days after the intervention; similar data was collected for the control group at baseline (30 days before data collection, an unspecified date which became the date used for analysis), 30, and 60 days after baseline date on these variables. This model allowed the researchers to capture the potential short and long-range effects of the intervention and to have a control group against which change could be assessed.

Table 1

Time Line for Data Collection

Control Group	Intervention Group
-30 days to baseline collect demographics & patient self-report	-30 days to intervention collect demographics & patient self-report
Baseline + 30 days Computer generated data	Intervention + 30 days Social Work follow-up & computer data
Baseline + 60 days Computer generated data	Intervention + 60 days Computer generated data
	Intervention + 90 days Computer generated data

Table 1 illustrates the timeline for data collection for both the intervention and control groups.

Medication adherence and exercise behavior was monitored by patient self-report. One researcher has noted, "Questioning patients about their compliance is the most readily available, valid method of measuring compliance in clinical practice" (Stephenson, Rowe, Haynes, Machuria, & Leon, 1993, p. 2781). At each site, a raffle incentive was offered for completion of self-reporting. Patients who had initially been recruited into the intervention or control group but had been hospitalized more than three consecutive days were immediately excluded from the study.

Data Analysis

Research instruments were used to collect data from both the intervention and the control group members. The data for both groups were merged allowing for both within-group and between-group statistical analysis. The data analysis was hypothesis driven in order to avoid type-II errors.

Research Instruments

Intervention group data was collected 4 times, 30 days before entering the study to establish the baseline for each patient, (the averages from the pre-intervention data became the comparison point against which change was measured), and at 30, 60, and 90 days post-intervention. At the time of the video intervention, the self-administered instrument was completed. It consisted of demographic questions that included who the patient could count on for emotional support, employment status and level of education, years on dialysis, and cause of kidney failure. In addition, they were asked two crucial questions, the first relating to patients' participation in physical activities and the second relating to compliance with blood pressure medication. These same two questions were repeated at time I+30 days, using the self-administered instrument. At this time, subjects were asked to try to recall those behaviors that could help in controlling blood pressure that were discussed in the video and reinforced through the social work intervention. Patients were asked to recall as many of the nine items as possible. The social worker notes the items recalled. Examples are, "Avoid missed treatments," "Avoid drinking too much fluids," and " Avoid skipping blood pressure medication."

Patients in the control group were given the same initial self-administered demographic and two-item instrument as the intervention group, asking about participation in physical activity and if they take their blood pressure medication as prescribed. For the control group, this was a one-time event with no follow up instruments.

Nephrology professionals reviewed both instruments in order to establish face validity. The instrument was circulated among these professionals and changes were made based on their suggestions. Reliability and validity are expected to be high, as most questions were factual. For example, respondents were asked if they increased their exercise time after viewing the video. This type of response is both factual and subjective and not subject to statistical measures of internal consistency. Respondents self-reported, making inter-rater reliability unnecessary. As there was only one scaled item, on medication compliance, the standardized alpha was not employed.

Findings

The findings include information about the demographics, physical activity, medication compliance, and blood pressure and weight change over time for both groups of patients. They also include data on what was recalled from the video and frequency and duration of treatments.

Demographics

Demographic findings show that both the intervention and the control group were closely matched on most items. The area where there was some difference was in employment status, where the intervention patients tended to be employed and the control group retired although the difference was not statistically significant. The age range for the control group was higher, 57 to 67, compared with 52 to 62 for the intervention group. Table 2 (on next page) summarizes these findings.

In addition, it was interesting to note that for both the intervention and control groups, the most frequent causes of End Stage Renal Disease were diabetes and hypertension; approximately 37% of the patients reported diabetes and 36% reported hypertension.

Physical Activity

An important aspect of this study was to discover if the amount and duration of physical activity would increase for the intervention group. Data for the intervention group revealed that at 30 days following the intervention (+30), 60% of patients reported an increase in exercise time and 16%, a decrease. There were no demographic characteristics that explained this difference. The only exception was that married patients were somewhat more likely to experience increase in exercise, at trend level Pearson X2 (8, N = 191) = 14.99, p = .059. This relationship cannot be taken too serious-

ly because when the data are dichotomized into married and not married, eliminating categories such as living with partner, divorced, and widowed, the difference disappears.

Intervention patients at +30 days were compared with control patients on whether they had engaged in physical activity. There was a 6 point difference on the means of the dichotomized, "yes"/"no" responses showing that the invtervention group was more physically active. This, however, was not a statistically significant difference at the .05 level.

Medication Compliance

Intervention group patients were asked at two points in time if they took their blood pressure medication as prescribed. A significant difference in medication compliance was found between the initial interview and 30 days following the intervention (+30) using a paired sample t-test at the .05 level (t = 1.985; p = .0490). Intervention group patients showed improved medication compliance at +30 days when compared to the control group, but not at the .05 level. The intervention did appear to improve medication compliance.

Missed Appointments

Missed appointments is an important measure because it not only affects the cardiovascular health of the patient but it implies a direction in attitude toward treatment. The data are divided in three ways: less than two missed appointments is a positive behavioral indicator, no change over the month in number of missed appointments, and more than two missed appointments is a negative indicator. When looking at change over time for the intervention group, there was only a very small change in the direction of missing fewer appointments.

Table 2

Demographics of Intervention and Control Groups

Intervention Group			Control Group		
Gender	N	Percent	**Gender**	N	Percent
Male	87	45.5 %	Male	78	45.6 %
Female	104	54.5	Female	93	54.4
Race	N	Percent	**Race**	N	Percent
White	-		White	-	
Non-Hispanic	77	40.3 %	Non-Hispanic	43	24.9%
Black	69	36.1	Black	83	48.0
Asian	3	1.6	Asian	3	1.7
Hispanic	27	14.1	Hispanic	31	17.9
Pacific Islander	11	5.8	Pacific Islander	11	6.4
Age	M	SD	**Age**	M	SD
Range	52-62	1.5	Range	57-67	1.5
Education	M	SD	**Education**	M	SD
Years	13	2.5	Years	12.5	2.4
Dialysis	M	SD	**Dialysis**	M	SD
Years	2.8	1.5	Years	2.5	1.5
Marital Status	N	Percent	**Marital Status**	N	Percent
Married	103	53.9 %	Married	84	48.8
Not Married	88	46.1	Not Married	88	51.2
Employment	N	Percent	**Employment**	N	Percent
Employed	33	17.4	Employed	19	11.0
Not Employed	86	44.2	Not Employed	76	44.2
Retired	73	38.4	Retired	77	44.8

For the control group there is a trend difference in the direction of missing more appointments, using the paired sample t test (t = 1.74; p = 08). Comparing the intervention group at +30 with the control group on missed appointments, the intervention group missed fewer appointments (independent samples t test: t = 2.03; P = .04). However at the +60 point this difference disappears. Both groups appear to move in the direction of missing appointments over time.

Duration of Treatment

Complying with the ordered duration of dialysis treatment represents another important variable in cardiovascular disease outcomes. Duration of treatment was measured for the intervention group for a period of 30 days prior to the intervention (-30), at the 30 days following the intervention (+30), the 60 days following (+60), and the 90 days following (+90). For the control group there are data at three points in time, 30 days to the baseline interview (-30), 30 days after baseline (+30), and 60 days after baseline (+60). There was no significant change over time within both groups, although only 1% to 3% of both groups reported missing more than 50 minutes of treatment at any given time. There were no significant differences between the intervention and control groups at +30 and +60 days.

Blood Pressure

Change in blood pressure is one of the most important criteria by which to judge the success of any intervention related to cardiovascular changes for dialysis patients. For the intervention group, blood pressure data was collected at 4 points in time, 30 days before the intervention against which changes in blood pressure readings were compared, at +30, +60, and +90. Any change of +/- 5 points is considered clinically significant; a 5-point increase is considered clinically significant in a negative direction and a 5-point decrease is seen as a positive direction for either systolic and diastolic readings. For the data analysis, the assumption was that it was better to decrease blood pressure than to increase it, although it is recognized that this may not be true for every patient. These chosen levels of blood pressure change are based on pre-dialysis readings, from a sitting position. The 5-point change has been cited as reflective of significant change demonstrating direction and trend toward improved blood pressure health (Cohen, 2000; NKF, 2000; Verdecchia et al., 1990).

The blood pressure for the intervention groups decreased over time, but the decrease was significant only at trend level (paired sample t test: t = 1.82; p = .07). However, when the intervention group's blood pressure decrease was compared with that of the control group at +30, there was a notable and statistical significant difference. The rate of decrease in blood pressure for the intervention and the control groups at +30 was 83% and 22% respectively (Pearson Chi Square = 42.7; df = 2; p = .001, two tailed). The intervention group fared better in their ability to reduce their blood pressure.

Weight

Weight changes were recorded in 3-kg increments, pre-dialysis treatment, considered to be clinically significant differences. It was assumed that a gain of 3 kgs or more was not in the best interest of the client, whereas a reduction of 3 kgs was considered to be a positive change. There were no differences found between the groups with regard to weight change and the data showed no significant changes within the groups over time. Apparently, the intervention had no effect on weight change, and for the control group weights remained mostly the same in the aggregate.

Recalled Educational Material

The design of the video highlighted nine areas of concern in the management of cardiovascular disease/risk for the dialysis patient. Brief social work follow-up was directed toward reinforcement of these areas. Intervention group subjects were asked, at 30 days after seeing the video, which areas they were able to recall. The percentage of subjects remembering each area is recorded in Table 3.

Table 3

Patient Recall of Modifiable Risk Factors

Avoid eating too much salt – 71%
Drinking too much fluid – 66%
Participate in physical activity – 64%
Skipping medications – 62%
Avoid missing treatments – 48%
Shortening treatments – 43%
Managing stress – 27%
Managing depression – 17%
Seeking social support – 12%

Placing together what patients remembered from intervention, the following linkages are noted:

- Sixty-four percent of the intervention group recalled the material on the need for physical activity. Sixty percent of the intervention group increased their physical activity.

- Seventy-one percent of the intervention group recalled content about avoiding eating too much salt and sixty-six percent recalled the content about avoiding drinking too much fluid, two behaviors that are critical in management of blood pressure. Over time, the intervention group showed a trend toward lowered blood pressure and, compared to the control group, a statistically significant decrease was noted for the 30-day period after the intervention.
- Sixty-two percent of the intervention group recalled the material about avoiding skipping blood pressure medication. Medication compliance for the intervention group showed a statistically significant improvement between the intervention time and at 30 days post intervention.

Study Limitations

As with any study dealing with chronic illness, this study has its limitations based on the unique characteristics/challenges/idiosyncrasies of the subjects and the disease. The day-to-day life of the dialysis patients is challenged from many quarters: there is constant vigil and concern over diet; medications regimes are frequently changed based on the medical exigencies of the moment; there is change in body image and function; physical energy is often easily spent. These physical concerns as well as the psychosocial stresses which frame the life of the dialysis patient and their family, must be considered as intervening variables in any study (Beder, 1999).

Conclusions

The study findings strongly suggest that the value and impact of the psychoeducational video as administered by the renal social workers and physicians, the follow-up materials, and the development and reinforcement of a wellness plan, have an important impact on the wellness behavior of this cohort. For the intervention group, the noted increase in medication compliance, fewer missed appointments 30 days following the intervention, the decrease in blood pressure levels, and the increase in physical activity are all indicators moving the ESRD patient toward cardiovascular health.

The video was shown to the study participants in the intervention group once. Despite the one time viewing, much of the material contained in the video was retained and very possibly linked with important and statistically significant behavioral changes. We can only speculate that, with repeated viewing of the video and education support by the social workers, the benefits would be extended.

Several areas in the video were less well remembered: the importance of social support, the impact of depression, and modes of stress management. These areas were not adequately well supported in the survey and, in light of their importance in contributing to risk of cardiovascular disease, they need to be revisited. This calls for a renewed effort to develop focused educational material in conjunction with a more focused social worker intervention.

That there can be behavioral change has been demonstrated in this study. With more frequent intervention both visually and through social worker support, the risks for cardiovascular disease can be reduced. Further study is warranted to determine the long-term impact of behaviorally focused education provided by social workers with this population and the impact of additional target behaviors.

Thank you to all social workers that participated in this research:

Fresenius Medical Care – San Diego: MaryAnne Bienkowski, Vicki Davis, Rebecca Hays, Donna Halshaw, Karen Husted, Carolyn King, Lynne LeSage, and Vivian Wohlwend.

Fresenius Medical Care – Dallas: Beverly Bush, Mary Beth Callahan, Jodi Johnson, Debra Jordan, Marie Maceda, Kati Malarcher, Marianne Moncrief, Melissa Perlow, Karla Pryor, Peter Rojas, Maryellen Welch, Laura Woodrow, Betty Wrigley.

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