Mastering Hemodialysis to Reverse Patterns of Missed and Shortened Treatments

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Missed and shortened treatments have potentially grave health consequences for dialysis patients, placing them at higher risk for fluid overload and increased hospitalizations. Missed treatments further negatively impact dialysis center revenues. Mindful of the social worker's dual ethical responsibility to patients and employing agencies, the investigators proposed a research study aimed at reversing patterns of missed and shortened treatments. Drawing on the pioneering work of Prochaska and DiClemente, a transtheoretical model of behavioral change was adapted for nephrology social work with treatment-resistant dialysis patients in a comparative study involving three treatment approaches. The findings suggest improved motivation for treatment adherence, fewer hospitalizations and a decrease in missed and shortened treatments for patients in the social work intervention group.

INTRODUCTION

Missed and shortened treatments exact a heavy toll on the health status of hemodialysis (HD) patients, potentially contributing to higher rates of hospitalization or death (Leggat, 2005; Loghman-Adham, 2003; McKinley, 2000). Patients with end-stage renal disease (ESRD) are hospitalized more frequently than patients with other chronic diseases, and missed treatments account, in part, for excessive use of emergency room care by patients on HD (Mallappallil et al., 2005). Missing one or more treatments per month increases the patient's risk of death, with each missed treatment associated with a 10% increase in mortality (Bander & Walters, 1998). Missed treatments are also thought to be associated with poor understanding about one's condition (Johnstone et al., 2004), increased likelihood of fluid overload, lower functioning, decreased well-being and the desire to terminate treatment altogether (Mazzella, 2004). In contrast to other reports suggesting that missing dialysis altogether is a rare occurrence (e.g., Christensen & Ehlers, 2002), Bander and Walters (1998) report that missing treatments is a habit that usually forms in the first 6 months of a patient's treatment and remains stable over time. Nephrology social workers report anecdotally that this phenomenon is far from uncommon. There is a need to understand *why* patients on HD miss or shorten treatments and to intervene in a way that improves and prolongs patients' life quality.

Mallappallil and colleagues retrospectively reviewed a convenience sample of 181 out of 403 emergency room visits by HD patients at an urban teaching hospital. The key findings reveal that fewer than 5% of emergency room visits resulted in hospital admissions; 7% of the ESRD patients had missed their HD sessions; and treatment could have been easily administered in an outpatient setting. In other research by Sherman et al. (1994), a randomly selected sample of 860 patients with ESRD was assessed to determine the frequency of missed and shortened treatments. Fifty percent of patients either missed or shortened treatments (or both) over a 12-week period covering 28,108 treatments. Another study on the incremental cost of providing adequate HD reveals that males, African Americans in particular, are over-represented among patients receiving inadequate dialysis due to more frequent shortening of treatment time (Sehgal, 2003). A fourth study conducted by an international team of medical researchers (Bleyer et al., 1999) found that out of 415 U.S. patients, 147 missed 699 treatments over a 6-month period (calculated as 28.1 missed treatments per 100 patient-months or 2.3% of all prescribed treatments). This outcome compared with 0 missed treatments per 100 patient-months for patients from Japan and 0 missed treatments per 100 patient-months for patients from Sweden. This finding by Bleyer and his colleagues suggests that non-adherence is far more prevalent in U.S. patients undergoing HD than in Swedish and Japanese patients.

In other clinical research, Kutner et al. (2002) identify smoking as a significant marker of priority placed on health status among a cohort of HD and peritoneal dialysis patients in Atlanta, GA. Kutner et al. report that patients who skip or shorten treatments and patients with excessive serum phosphate values are more likely to be smokers. Their finding suggests that smoking

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may explain, in part, why patients miss or shorten their treatments. In this same research on the psychosocial predictors of non-adherence, patients who skipped treatments were younger (p = 0.00007), more likely to be African American (p = 0.02), and less likely to report a household income greater than $20,000 ($p$ = 0.003) than patients who had not skipped treatments (Kutner et al., 2002).

Others have suggested that physical discomfort, transportation problems, inconvenient therapeutic regimes (including dietary restrictions, medications and restricted fluid intake) as well as demographic variables (including age, marital status, educational level and socioeconomic status) can influence adherence (Loghman-Adham, 2003; McKinley, 2000). Despite the rich data concerning missed and shortened treatments, little is known about the *reasons* patients give for missing their treatments or shortening their time on the dialyzer. Although the renal care industry has identified psychosocial issues as important determinants of successful renal disease management in high-risk patients, more research needs to be done in a meaningful way (Johnstone, 2005; Neal et al., 2005) to engage patients who miss or shorten their treatments.

PURPOSE OF THE RESEARCH

The researchers aimed to reverse patterns of missed and shortened treatments at an outpatient dialysis center located in the Tampa Bay area of west central Florida where, in response to the social worker's internal continuous quality improvement questionnaire, patients reported that they missed or shortened treatments due to schedule conflicts with work and child care, hospitalizations, not feeling well or feeling well enough to skip saying "my labs were good." In response to patient feedback, the dialysis center administrators added a patient educational component that included chairside video instruction on ESRD processes as well as didactic instruction provided by the nursing staff. The authors compared the effectiveness of these two educational modalities for reducing missed and shortened treatments with a social work intervention based on a cognitive-behavioral, psychoeducational approach. All three modalities assumed that more information about dialysis would correlate with greater adherence to treatment. Using the psychoeducational approach, the authors targeted the most treatment-resistant patients to address the psychosocial dynamics underlying missed and shortened treatments and actively engage patients in a change process through an instructional format delivered over four weekly sessions. The term *treatment-resistant* denotes patients with missed treatment patterns, who struggle with treatment adherence, and miss, on average, four or more treatments per month. The study builds on the researchers' previous findings that suggested the efficacy of a group cognitive-behavioral intervention for mediating depression and social support (Cabness et al., 2006).

STUDY DESIGN

The research intervention was a nonrandomized, quasi-experimental design targeting treatment-resistant patients for change following exposure to the social work group intervention over 4 weeks. A comparison group of patients receiving video instruction (group 1) and didactic teaching by nursing staff (group 2) was randomly selected by a nurse to reduce researcher bias. The authors sought to compare the effectiveness of the social work group cognitive-behavioral intervention (group 3) with the two other instructional modalities, as evidenced by sustained positive changes in patient behavior when measured at 30 days, 60 days, 90 days and 6 months following the interventions.

All patients were invited to attend a series of four classes, entitled "Mastering Hemodialysis." Flyers were posted in the dialysis center and invitations were extended to patients with a history of missing and shortening their treatments. The patients were encouraged to attend if they felt they were struggling with making changes in their health lifestyles. They were invited to attend classes and listen to new coping strategies with no pressure to make any changes in their treatment regime unless they chose to do so. The psychoeducational approach provided patients with information on the history of dialysis, with photographs of early dialyzers; education on the function of the kidneys and specific parts of the body that are affected when they fail; cognitive-behavioral techniques regarding thought processing, associated feelings and reframing; transplant information and the importance of adherence; setting goals and formulating action steps to achieve them; and finally some tips for addressing relapse. In each class, they also had opportunities to discuss what they had learned, how they felt and changes that they had successfully implemented or had not been able to make. Using motivational interviewing, the social worker acknowledged each patient's efforts in achieving personal goals. Miller and Rollnick (2002) define motivational interviewing as a client-centered counseling style for eliciting behavior change by helping clients explore and resolve ambivalence.

Patients were offered incentives, in the form of a gift card drawing, to attend each class. Wal-Mart gift cards were also given at pre- and post-testing following the administration of the SF-36v2, BDI–FastScreen and a patient questionnaire created by the social worker. Refreshments were provided during each class, and consultation was sought from the center's dietitian on acceptable types of snacks for the patients. Samples of all types of binders were available to the patients to encourage dietary adherence. Arrangements were made for patients who required transportation to attend the classes.

THEORETICAL FRAMEWORK

The research proposed to test a stage model of behavioral change, developed by Prochaska and DiClemente (1983), toward decreasing patient-identified risk factors for missed and shortened treatments. Prochaska and DiClemente identified six stages of behavioral change: precontemplation, contemplation, preparation, action, maintenance and relapse. Their cognitive-behavioral model has been further developed to embrace affective states as well, thereby adding the transtheoretical component. The transtheoretical model has been found useful for assessing the cognitive stage of patients in the process of changing specific health behaviors. The model has been used successfully for smoking cessation (DiClemente et al., 1991), improving dietary behavior (Campbell et al., 1994), increasing mammography rates among women at mid-life (Rakowski et al., 1998) and consenting to cadaveric organ donation (Robbins et al., 2001). It is believed that the research reported here is the first formalized study to apply the transtheoretical model of behavioral change (Velicer et al., 1998) to treatment-resistant HD patients.

SAMPLE CHARACTERISTICS

The social work intervention group consisted of 11 males and 3 females (n = 14). The majority were African American (76.92%), ranging in age from 25 to 66 years, with a mean age of 45.5 years. Nearly all had completed high school and most were unemployed. Four were smokers. The average length of time on dialysis was 1.14 years. The comparison group, mostly African Americans (79%), consisted of 7 males and 7 females (n = 14), ranging in age from 22 to 59 years, with a mean age of 44.6 years. There were no smokers in this group. The average length of time on dialysis was 1.36 years. All patient annual income was <$20,000. The major difference between the two groups resided in the rate of treatment adherence. The sample characteristics for all participants are shown in Table 1.

Table 1

Sample Characteristics (n = 28)		
Gender	***n***	**Mean Age**
Male	18	50.39
Female	10	36.40
Ethnicity		
African American	23	43.52
Caucasian	3	54.00
Hispanic	2	54.00
Length of Time on Dialysis		
1–6 months	4	48.75
7–12 months	4	47.75
More than 1 year	6	39.00
More than 2 years	14	46.50
Education		
Less than 12 years	8	35.50
Graduated high school	9	47.67
Some college	6	45.00
College graduate	5	57.60
Marital Status		
Single	14	39.29
Married	6	45.33
Separated	3	54.33
Divorced	3	56.33
Widowed	2	58.50

KEY FINDINGS

For the 3 months prior to the social work intervention, patients who were enrolled in the intervention group had the highest number of missed and shortened treatments as well as the highest rate of inpatient admissions. Following the interventions, a review of the aggregate mean group differences revealed positive changes in the number of missed treatments, shortened treatments and inpatient admissions for all three groups, with the greatest change occurring in the social work intervention group. The changes were evaluated at 30, 60 and 90 days after the intervention and compared with pre-intervention adherence rates. However, there was also evidence of sustained positive changes in each category for the social work intervention group when measured at

6 months following the intervention. Missed treatments at 3 months positively and significantly correlated with missed treatments at 6 months (r = .867, $p \leq 0.01$) for the social work intervention group, suggesting that fewer missed treatments at 90 days were also likely, under the same conditions, at 180 days. The findings are both statistically significant and clinically important. These changes are shown in Tables 2–4.

Table 2

Comparison of Group Mean Differences for Missed Treatments						
Group	**PRE**	**MIST x 3**	**Difference Between Means**	**MIST x 6**	**Difference Between Means**	***N***
Video	**1.00**	**0.86**	**-0.14**			**7**
RN teaching	**1.57**	**0.57**	**-1.00**			**7**
SW group	**6.46**	**2.15**	**-0.77**	**3.46**	**-3.00**	**14**

Differences between the means in missed treatments are shown before the interventions (PRE) and at 3 months post-intervention (MIST × 3) for all three groups, and at 6 months post-intervention (MIST × 6) for the group receiving the social work intervention only.

Table 3

Comparison of Group Mean Differences for Shortened Treatments						
Group	**PRE**	**SHORT x 3**	**Difference Between Means**	**SHORT x 6**	**Difference Between Means**	***N***
Video	**4.17**	**3.00**	**–1.17**			**7**
RN teaching	**1.71**	**1.14**	**–0.57**			**7**
SW group	**2.46**	**2.15**	**–0.31**	**2.15**	**–0.31**	**14**

Differences between the means in shortened treatments are shown before the interventions (PRE) and at 3 months (SHORT × 3) post-intervention for all three groups, and at 6 months post-intervention (SHORT × 6) for the group receiving the social work intervention only.

Table 4

Comparison of Group Mean Differences for Inpatient Admissions						
Group	**PRE**	**INP x 3**	**Difference Between Means**	**INP x 6**	**Difference Between Means**	***N***
Video	**0.00**	**0.29**	**0.29**			**7**
RN teaching	**1.43**	**0.43**	**–1.00**			**7**
SW group	**1.46**	**0.85**	**–0.61**	**0.38**	**–1.08**	**14**

Differences between the means in inpatient admissions before the interventions (PRE) and at 3 months (INP × 3) for all three groups, and at 6 months post-intervention (INP × 6) for the group receiving the social work intervention only.

Unlike Kutner et al. (2002), the authors found no association between smoking and shortened treatments or between smoking and excessive serum phosphate levels, perhaps owing to the small sample size and so few smokers among any of the groups. However, the authors observed that the women in the intervention group tended to miss treatments at a higher rate than the men, leading to a gender effect. This supports the finding that demographic variables influence adherence (Loghman-Adham, 2003; Takaki et al., 2007). The authors further noted the overall improved functioning of the social work intervention group, as evidenced by the marked differences between pre- and post-test scores of group 3 on the SF-36v2 when compared with the baseline comparison group scores (post-intervention only) following the administration of the video and didactic modalities. The SF-36v2 scores are shown in Table 5. Similarly, differences in the BDI–FastScreen pre- and post-test scores of the social work intervention group were noted and compared with the baseline comparison group scores. These figures are shown in Table 6.

CONCLUSION

Consistent with Johnstone et al.'s (2004) findings, our research data suggest that missed and shortened treatments are likely to be associated with poor understanding about one's condition and the dialysis process. In the current study, the greatest improvements were made by patients attending all four of the "Mastering Hemodialysis" classes. The educational materials were presented objectively and group discussion was encouraged. Consistent with motivational interviewing techniques, patients were not pressured to change and there were no overt expressions of expectations or recommended outcomes. The research demonstrates further

Table 5

SF-36v2 Transformed Scores (0-100 Scoring)

	Intervention Group		Comparison Group *(baseline)*
	Pre-test	Post-test	Post-test only
Mean			
Physical functioning (PF)	54.48	↑58.22	56.43
Physical role (RP)	45.42	↑62.50	50.00
Body pain (BP)	63.27	↑64.43	61.00
General health (GH)	43.38	↑49.50	52.71
Vitality (VT)	51.25	↑63.69	58.48
Social functioning (SF)	63.33	↑77.68	66.35
Emotional role (RE)	67.22	↑80.36	61.01
Mental health (MH)	70.67	↑78.13	69.55

Note: SF-36v2 scores were tabulated using QualityMetric™ scoring software

Table 6

Comparison of Group Mean Scores on the BDI—Fast Screen				
Group	**Pre-BDI**	**Post-BDI**	**Difference**	***N***
Video		**1.2857**		**7**
RN Teaching		**3.2857**		**7**
SW Group	**1.3571**	**0.7692**	**–0.59**	**14**

Comparisons of the mean scores on the BDI–FastScreen for all three groups (post-intervention only) and the difference between the means (pre- and post-intervention) for the group receiving the social work intervention.

that reversing patterns of missed and shortened treatments is likely to occur when patients are guided, following a transtheoretical model of change, to assimilate their own conclusions about their behaviors based on the information available to them and then begin to integrate this knowledge with their own personal improvement goals.

The gender effect associated with missed treatments is thought to be related to women's ownership of family issues (e.g., child care during summer and holiday periods, sick children, housing and transportation) at a higher rate than men in the study. More research is needed to assess the influence of seasonal variations in women's treatment adherence.

The study is limited by the small sample size and nonrandom, single-subject design, which makes statistical analysis difficult to achieve despite clinical observations pointing to the overall effectiveness of the social work intervention. Adding pre-intervention baseline scores for the comparison group would yield a "cleaner" research study design. The research reported here is described by Kerlinger (1992) as a "one-shot-case study." Although we have concluded that the social work intervention was effective, "with such a design the conclusion is weak" (Kerlinger, 1992). The authors cannot think of a greater reason to encourage more research on the efficacy of renal social work interventions. Clearly, the risk of oversampling increases with each research intervention with single subjects. Ideally, nephrology social work research with dialysis patients should engage multiple sites for attaining larger samples. Such an approach would permit random assignment to different treatment groups and provide data that have greater likelihood of approaching statistical significance.

Staff involvement is very important to patient morale. The authors believe that fostering a patient-centered environment in dialysis centers might further contribute to decreases in the number of missed and shortened treatments. A patient-centered orientation assures alternatives, such as rescheduling treatment days or times, when patients cannot keep their treatments. Of course, patients should be encouraged to attend their scheduled appointments but, when emergencies occur, they should be counseled by members of the treatment team

to reschedule, so as not to shorten treatments or miss altogether.

The authors suggest providing classes to new patients, using the "Mastering Hemodialysis" materials (available from the authors), to deter patients from developing the patterns of missed and shortened treatments that frequently develop during the initial months of dialysis. They further recommend increased advocacy with transportation agencies on a macrosystems level to ensure that patients have the means to become and remain treatment adherent.

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