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Adjustment to Hemodialysis Treatment Through Behavioral Controls

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The present study was conducted to examine the hypothesis that compliant chronically ill patients, typically described as "adjusted," reinforce more positive social environments using behavioral controls than noncompliant patients, typically described as "maladjusted." Specifically, it is hypothesized that diet-compliant chronic hemodialysis patients emit signifcnatly more active involvement-in-treatment behaviors and more social behaviors than diet-noncompliant chronic hemodialysis patients. Subjects, who ranged in age from 30 to 77 years, were outpatients at a kidney center. Behavioral observations were conducted to assess the occurrence or frequency of (1) four involvement-in-treatment behaviors that are routinely taught to all patients and (2) two social behaviors, which were patient verbalizations and smiles. The results showed that compliant patients emitted significantly more involvement-in-treatment behaviors and smiles than noncompliant patients. Results support the proposed control framework that compliant, in contrast to noncompliant, chronically ill patients have recourse through positive behavioral controls when adjusting to the stresses of illness. It was proposed that through these controls, compliant patients reinforce positive environments rather than simply respond to life circumstances as given.

KEY WORDS: hemodialysis; behavioral controls; compliance; noncompliance.

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INTRODUCTION

Individuals with chronic renal disease are often put on hemodialysis treatment, which involves continuous dependency on a machine and the medical staff for life support. As with many chronic illnesses, treatment also involves adherence to a strict dietary regimen. Those hemodialysis patients who comply to the dietary regimen are typically described as "adjusted" patients; those who are noncompliant are typically described as "maladjusted" (Abram, 1974).

Adjusted hemodialysis patients are further described in the literature as patients who cooperate with the treatment staff and actively participate in the treatment process. Conversely, maladjusted patients are often reported to be noncooperative with the nursing staff, minimally involved in their treatment, stressed, depressed, and inappropriately hostile and angry toward the treatment staff (De-Nour & Czackes, 1974; Huber & Tucker, 1984; Nadelson, 1971; Rhodes, 1981; Short & Wilson, 1969).

Although suggested in the literature, no empirical data exist to support the conclusion that diet-compliant patients actually emit psychological, social, and treatment-related behaviors in the treatment setting that are different from those behaviors emitted by diet-noncompliant patients. The present study, in part, sought to provide data addressing this issue.

More importantly, the present study was conducted to examine the related hypothesis that diet-compliant chronically ill patients reinforce more positive treatment environments using social behavioral controls (smiles and verbal interactions) than noncompliant patients. It was further hypothesized that diet-compliant chronic hemodialysis patients emit significantly more behavioral controls through active involvement in treatment (directing needle sticks, assisting with blood-pressure check, weighing self, and setting up the area in preparation for treatment) than noncompliant patients.

The empirical basis for this hypothesis is evidence suggesting that realization of some type of control by the hemodialysis patient may be important in patient adjustment to dialysis treatment—a process that fosters feelings of vulnerability and dependency (Blodgett, 1982; Abram, 1974). Ben-Ari-Smira (1983) found that the higher a hemodialysis patient scored on Rosenbaum's (1980) Self-Control Scale, indicating higher resourcefulness, the more the patient adhered to fluid intake restrictions.

Michenbaum (1977) had earlier suggested in his cognitive-behavioral theory that once a person has learned how to gain control, perception about the aversive condition changes from that of "learned helplessness" (perceived inability to change the existing negative circumstances) to that of "learned resourcefulness" (perceived ability to change the existing conditions in one's favor.) Similarly, Poll and De-Nour (1980) found that patients having internal loci of conrol (the perception that their fate is within their own hands) were significantly more diet compliant and accepting of their disability than patients with external loci of control (the perception that their fate is in the hands of others).

The hypothesis in the study reported here was that diet-compliant hemodialysis patients create positive interpersonal environments by emitting behaviors that nurses view as important (Huber & Tucker, 1984; Tucker *et al.*, 1986). These include behaviors such as cooperation with the staff, involvement in treatment, and friendliness that gain positive reinforcement and favor from nurses, which in turn, reinforce a positive self-image. A positive supportive environment and a positive self-image are counterconducive to stress, depression, and hostility often displayed by noncompliant patients.

METHOD

Subjects

Subjects were 36 chronic hemodialysis outpatients at the North Florida Kidney Center, who ranged in age from 30 to 77 years and who had been on dialysis from 1 to 8 years. There were 19 compliant patients and 17 noncompliant patients selected from a population of 80 patients. The mean age of the compliant patients was 58 years and the mean number of years on dialysis was 5; the mean age of the noncompliant patients was 56 years and the mean years on dialysis was 4.4. The two groups did not differ significantly on age, educational level, socioeconomic status, and number and kind of physical infirmities (amputated limb and blindness). Prior informal observation of those patients with physical disabilities indicated that their disabilities would not inhibit their involvement-in-treatment behaviors.

The two groups of patients were selected by the researchers using two criteria: (1) compliance to the dietary regimen and (2) a dialysis history of 1 year or more. The objective dietary compliance criteria were interdialysis fluid weight gain and serum potassium level, which are indices of fluid and food intake compliance, respectively. Patients with both serum potassium levels of 5.6 mEq/liter or higher and interdialysis weight gains over 2.73 kg on more than three occasions during the 6 months prior to the study were considered noncompliant to the dietary regimen. The mean serum potassium level for compliant patients (n = 19) was 4.5 mEq/liter; that for noncompliant patients (n = 17) was 6.5 mEq/liter. The mean interdialysis weight gain was 1.86 kg for compliant patients and 3.86 kg for noncompliant patients. (Treatments occurred three times a week for approximately 4 hr each session.) Patients who did not meet these noncompliance criteria were considered compliant. The patients who ultimately served as subjects for both groups were those who closely matched in age and other above-mentioned subject variables.

Instrument

Observation sheets were used to record data. The sheets contained the following target behaviors, with allotted space for check marks under each behavior to indicate either its occurrence or its frequency: (1) patient weighs self or asks for assistance in weighing self; (2) patient assists with the measurement of blood pressure (rolls up sleeve, positions arm); (3) patient opens the packet containing an IV needle; (4) patient directs needle placement (i.e., gives verbal instructions, points to site); (5) patient verbalizes; and (6) patient smiles. The first four behaviors were categorized as involvement-in-treatment behaviors, while the last two were categorized as social behaviors. All patients had been taught the involvement-in-treatment behaviors as part of their orientation to dialysis treatment. Moreover, the nurses sporadically encouraged both compliant and noncompliant patients to emit these behaviors; no differential encouragement appears to have been given to any one group.

The involvement-in-treatment behaviors were recorded via check marks indicating their occurrence, while frequency counts of social behaviors were recorded. A verbalization was defined as an utterance both preceded by and followed with a pause or change of speakers. For example, "Hello, How are you?" was recorded with one check mark, as there was no pause or change of speaker. However, "Hello Nurse Jane" (patient speaking), "Hi Paul" (nurse speaking), "How are you today?" (patient speaking) was recorded with two frequency marks. Space was provided on the observation sheets for the date, time of observation, observer's name, name of the patient's attending nurse, and patient's subject code number.

Procedure

The hemodialysis treatment was administered to all patients in a large open unit which included separate dialysis equipment for 12 patients, 6 on each side of a rectangular room. The patients were treated by one of five nurses at any one period. Prior to the study, the nursing supervisor made random within-patient group assignments so that each nurse would treat both compliant and noncompliant patients. Two psychologists and four graduate psychology students were each paired with an undergraduate psychology student to form six two-member observation teams. Only two observation teams were present in the unit at any one time. Each team took positions at opposite ends of the rectangular unit, but all of the observations were made while the patients were in the two sections nearest the observation teams.

Observers were 4 to 6 ft away from the patients, which allowed them to clearly hear patient verbal interactions and yet remain somewhat unobtrusive.

In a pilot study, each team conducted 45-min observations of patients not in the present study to determine if the interrater reliability for the teams was acceptable ($\geq .85$) and to reduce observer reaction effects. Because subjects are influenced by the presence of observers, the pilot study, which occurred under the same conditions as the actual experiment, served to diminish perceived observer instrusiveness. Additionally, the presence of the research team in the treatment room was common because of prior research activities at the Kidney Center.

Prior to the pilot study, patients and nurses were told that students and faculty members from the University of Florida would be observing and taking notes on what happens during dialysis treatment. The nurses and patients were not aware of the nature of the observations. Moreover, since there were several patients in the unit at one time, the specific target of observation was not apparent. Finally, although the nurses were in agreement about the relative compliance of the patients, they were not informed about patient classification as compliant or noncompliant, nor were they informed about the specific observations which were recorded.

Data collection on the subjects began immediately following the pilot study since the mean interrater reliability of .90 was acceptable. The patients were randomly assigned to each team. Observers and nurses were blind to the subject's compliance/noncompliance classification. Each team observed six subjects and each subject was observed by the same team for the first 45 min of treatment. The observation sessions, which occurred on two occasions separated by a period of 2 weeks, began as soon as the subject entered the treatment room.

RESULTS

The interrater reliability coefficients (averaging Time 1 and Time 2 observation data) were .97 ($n = 36, p < .0001$) for involvement, .96 ($n = 36, p < .0001$) for smiles, and .98 ($n = 36, p < .0001$) for verbal behavior. The consistency of ratings between Time 1 and Time 2 for the three dependent variables was .68 for involvement ($n = 36, p < .0001$), .67 for smiles ($n = 36, p < .0001$), and .63 for verbal behavior ($n = 36, p < .0001$). In the main analyses, data from Times 1 and 2 were averaged.

The correlation coefficients among the dependent measures for the compliant patients were $r = .51$ ($n = 19, p < .02$) between involvement and smiling, $r = .41$ ($n = .10\ 19, p < .08$) between involvement and verbal behavior, and $r = .75$ ($n = 19, p < .0002$) between verbal behavior and smiling. For the noncompliant patients the correlation coefficients were r

$= .02$ (n = 17, $p < .94$) between involvement and smiling, $r = -.13$ (n = 17, $p < .62$) between involvement and verbal behavior, and $r = .67$ (n = 17, $p < .003$) between verbal behavior and smiling. To determine if there were significant group differences with regard to these correlation coefficients, transformed t statistics were applied to the data. Significant group differences were found for involvement and smiling [(.51 − .02) (r = .49, $p < .02$)] and for involvement and verbal behavior [.41 minus −.13) (r = .54, $p < .02$)]. However, the groups did not significantly differ on correlations between smiling and verbal behavior [(.75 − .67) (r = .08, $p < .02$)].

The SAS (Statistical Analysis System) general linear model procedure for unequal cell size was used to compare compliant patients and noncompliant patients on the variables involvement in treatment, smiles, and verbalizations. Nurses were assumed to be a random factor in the model because they were rotated among patients across groups. Consequently, patient–nurse pairings across observations on each patient sometimes involved a different nurse, making it impractical to statistically examine a nurse effect. The descriptive statistics for the three dependent measures were as follows: involvement—M = 4.31, SD = 2.18, range = 0 to 8; verbal—M = 47.96, SD = 36.49, range = 5 to 182; and smiling—9.10, SD = 9.79, range = 0 to 39. The compliant patients (M_1), as compared to the noncompliant patients (M_2), were shown to be significantly more involved in treatment (M_1 = 4.95, M_2 = 3.59) and smiled more (M_1 = 12.76, M_2 = 5.01) (see Table I). However, the patient groups did not differ significantly differ on the number of verbalizations emitted.

In order to examine and control for effects of years in treatment, a series of 2 × 3 analyses of variance were performed involving compliant and noncompliant patients and three categories of years of treatment [1 to 2 years (n = 10), 3 to 4 years (n = 11), and 5 or more years (n = 15)]. No significant group differences with regard to years of treatment and the variables verbal behavior, involvement in treatment, and smiles were found.

Table I. Analysis of Variance Summaries for Three Dependent Variables Comparing Compliant and Noncompliant Patients

Source of variation	Sum of squares	df	Mean square	F
Involvement				
Between	18.79	1	18.79	4.29[a]
Within	149.07	34	4.38	
Smiles				
Between	538.68	1	538.68	6.51[b]
Within	2813.37	34	82.75	
Verbalizations				
Between	2744.58	1	2744.58	2.13
Within	43862.14	34	1290.06	

*$p < .05$.
**$p < .02$.

DISCUSSION

The major findings showed that compliant, in comparison with noncompliant, patients (not controlling for attending nurse) were significantly more involved and smiled more. No significant differences between patient groups were found on the dependent variables of years in treatment. These results provide empirical support for assertions in the literature that diet-compliant patients actually emit behaviors in the treatment setting different from those behaviors emitted by diet-noncompliant patients. However, it should be noted that compliant patients did not emit significantly more verbalizations than noncompliant patients, although the former did evidence a higher mean number of verbalizations than the latter. The implication of this nonsignificant finding is that behavioral differences between noncompliant and compliant patients may be negligible across some behaviors and thus may be difficult to assess. This finding also suggests that in some areas compliant and noncompliant patients may not differ in their treatment-related behaviors. However, in those areas where research has shown that compliant and noncompliant patients clearly differ, it seems important to execute structured behavioral assessment across time in order to determine the need for appropriate assessment-based interventions to facilitate adjustment to hemodialysis treatment.

The observed behaviors did indeed support the description of compliant patients as adjusted patients and noncompliant patients as maladjusted patients. The compliant patients did emit the kind of behaviors which hemodialysis patients and nurses have reported to be important for adjustment to hemodialysis. These behaviors include involvement in treatment, being viewed positively by others, and having a pleasant personality (Huber & Tucker, 1984).

Support was also provided for the hypothesis set forth in this study that diet-compliant chronically ill patients reinforce more positive social environments using behavioral controls than noncompliant patients. Using behaviors such as those observed, compliant or "adjusted" patients become active agents in reinforcing more consistently favorable conditions in an environment, which, in turn, serves to affect positively those same persons who reinforced the more favorable conditions. The chronically ill patient, then, can become an agent of his/her own life circumstances by acting to reinforce a personal, social, and medical environment rather than being a passive recipient of medical and social circumstances.

The finding of more significant correlations on the dependent variables among the compliant patients suggest the existence of an underlying factor that differentiates compliant from noncompliant patients. Again, behavioral control is reflected by the more consistent and interrelated behavior of the compliant patients under conditions of chronicity.

Yet the proposition that the patient is an agent of his/her own treatment environment can be fully explored only if nurses' behaviors with patients are also analyzed. This will require executing several observations across a period of time that will allow multiple patient interactions with the same nurse and with different nurses. In addition, future research should examine nurse tenure in dialysis as a factor in these interactions. Regardless of the nurses' influence, the patient is one of the primary actors and may initiate and maintain the positive interactive process with nurses through their reinforcing behaviors. Furthermore, in most dialysis settings nurses will be paired with patients to fit personnel schedules rather than the quality of particular patient–nurse interactions; thus, patients may adapt to these treatment conditions through the use of behavioral controls.

In summary, the results of this study suggest the need for chronically ill patients to be trained to effectively use behavioral controls that foster positive supportive environments and positive self-images conducive to adjustment to treatment. Provision of social skills training, assertiveness training, and behavior management training seems indicated for fostering behavioral control. Such control allows chronically ill patients to reinforce environments rather than accept themselves as victims of their immutable circumstances.

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