DEPRESSION AS A RISK FACTOR FOR NON-ADHERENCE TO OUTPATIENT HEMODIALYSIS TREATMENT SCHEDULES

Nancy Ann Calton
B.A., University of Missouri, Columbia, 1988
M.A., University of Missouri, Columbia, 1993

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DEPRESSION AS A RISK FACTOR FOR NON-ADHERENCE TO OUTPATIENT HEMODIALYSIS TREATMENT SCHEDULES

A Thesis

by

Nancy Ann Calton

Approved by:

[Redacted], Committee Chair
Dr. Christine Vourakis, Professor, Division of Nursing

[Redacted], Second Reader
Dr. Ann Stoltz, Chair, Division of Nursing

Date May 7, 2009
Student: Nancy Ann Calton

I certify that this student has met the requirements for format contained in the University format manual, and that this thesis is suitable for shelving in the Library and credit is to be awarded for the thesis.

Dr. Kelly Tobar, Graduate Coordinator

Division of Nursing
Abstract

of

DEPRESSION AS A RISK FACTOR FOR NON-ADHERENCE TO OUTPATIENT HEMODYALYSIS TREATMENT SCHEDULES

by

Nancy Ann Calton

Statement of Problem

The role of depression in non-adherence to outpatient HD treatment schedules remains unclear and requires further investigation. This study focused on adherence to the treatment schedule, specifically, missed and shortened outpatient HD treatments and the potential relationship between depression and non-adherence to the treatment schedule.

Sources of Data

The study involved screening with the Beck Depression Inventory-II (BDI-II) to measure participant levels of depression. Additionally, a chart review was included to tally the total number of non-adherent missed treatment minutes and record other participant information including age, gender, ethnicity, insurance status, medical history, medications, and length of time as a hemodialysis patient was recorded.

Conclusions

Participants who missed no treatment time due to non-adherence had significantly lower BDI-II scores than those who missed 100 minutes or more due to non-adherence. Further, no significant differences involving depression and non-adherence were found with respect to gender or ethnicity. Older participants were more adherent than younger participants. Participants with neither hypertension nor diabetes had lower levels of depression than those who had one or both of those co-morbidities. Frequently noted non-somatic depressive symptoms included suicidal ideation, self-dislike, worthlessness, and decreased enjoyment of activities that they previously enjoyed. Nephrology nurses must intervene through close nurse/patient relationships, recognition of depressive symptoms, screening, and referrals to appropriate mental health professionals.

Committee Chair

Dr. Christine Vourakis, Professor of Nursing

Date /
DEDICATION

I would like to dedicate my thesis to my patients with Chronic Kidney Disease on outpatient hemodialysis that I have cared for over the years. I have become increasingly committed to doing all that I can to achieve a high standard of care for them. My hope is to continue in my efforts to conduct research on their behalf throughout the remainder of my nephrology nursing career.
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Additionally, I greatly appreciate the participation of my patients at the clinic in this research study along with the interest of my colleagues and coworkers. This research would not have been possible without the interest and participation and of my patients. I am confident that the findings of this research will contribute to a higher standard of care on their behalf.

I would also like to express my thanks to my family and friends who have followed my progress and encouraged me along the way. Gayle Bachand was very understanding as my supervisor at the clinic as she supported my efforts to balance my work responsibilities, family life, and graduate education. My fellow nurses Shirley, Touron, Kathy, Joy, Margaret, and Sandy took such an interest in my thesis and were a source of great professional and personal encouragement. Additionally, several of my other friends have always been there for me throughout the years: Marcia, Marilou, and
Cely, along with the rest of the clinic group, thanks for all of your support. And many
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I believe that the traits of dedication, perseverance, kindness, and compassion that they
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Chapter 1

PROBLEM STATEMENT

Introduction

Non-adherence to treatment regimens is prevalent among patients with chronic illness (Vermeire, Hearnshaw, Van Royen, & Denekens, 2001). Non-adherence involves patient actions which fail to correspond to recommended medical or health advice. The prevalence of non-adherence has been estimated to be 30-50% of all patients, regardless of disease, prognosis, or setting (Morris & Schulz, 1992). Poor adherence to treatment regimens may have a major impact on clinical outcomes (Melnikow & Kiefe, 1994).

Similarly, non-adherence has also been noted among patients receiving outpatient hemodialysis (HD). Non-adherence to treatment schedules is one of the many non-adherence issues frequently seen among patients receiving outpatient HD. A recent study details four major areas of the treatment regimen where non-adherence may adversely affect clinical outcomes: fluid restriction, dietary guidelines, prescription medication instructions, and attendance at HD sessions (Denhaerynck et al., 2007). Estimates vary regarding prevalence of non-adherence due to inconsistencies in methods of defining non-adherence, however the negative impact on clinical outcomes is readily apparent.

Non-adherence has been attributed to a number of factors such as patient co-morbidities, demographics, age, and socioeconomic factors. Individual patient characteristics such as gender, age, ethnicity, and history of hypertension are also possible factors in non-adherence (Lancaster, 2001).
This research will focus on depression as a contributor to non-adherence. The prevalence of mental illness in primary care patients is indeed quite high. Twenty-five to thirty three per cent of primary care patients have a mental disorder. One-third to one-half of these patients is not accurately diagnosed. Studies have demonstrated that somatization, i.e., somatic symptoms such as headaches, stomach pain, and insomnia are primary examples of reasons for the missed diagnoses (Beliles & Stoudemire, 1998).

Patients with chronic kidney disease (CKD) on dialysis often suffer from depression as well. Dialysis patients frequently do not receive treatment for their depression. The impact of untreated depression has far reaching clinical implications for these patients. (American Nephrology Nurses Association, 2007) Depression occurs with much greater frequency in the HD population than in the general population and is a threat to their survival (Lancaster, 2001). Depression is the most important underlying problem in the suicidal ideation and behavior of dialysis patients. (Burton et al., 1986)

Statement of the Problem

The role of depression in non-adherence to outpatient HD treatment schedules remains unclear and requires further investigation. This study will focus on adherence to the treatment schedule, specifically, missed and shortened outpatient HD treatments and the potential relationship between depression and non-adherence to the treatment schedule. The study involves screening with the Beck Depression Inventory-II (BDI-II) to measure participant levels of depression. Additionally, a chart review is included to tally the total number of non-adherent missed treatment minutes and record other participant information such as demographic data and medical information.
Research Questions

Primary Research Question

What is the relationship between non-adherence to the outpatient HD treatment schedule and depression in CKD patients? Do participants who score high and demonstrate severe depression on the Beck Depression Inventory-II also exhibit higher numbers of non-adherent missed treatment minutes than those whose BDI-II scores are low and do not demonstrate severe depression?

Corollary Research Questions

1. Do specific subgroups of participants score higher on the BDI-II and demonstrate higher numbers of non-adherent missed treatment outpatient HD minutes?
   a. Is gender related to higher levels of depression and greater non-adherent missed treatment time?
   b. Are depression and increased numbers of non-adherent missed outpatient HD minutes related to age?
   c. Are participants with hypertension at greater risk for severe depression and resulting increased numbers of missed outpatient HD treatment minutes?
   d. Are Type I and Type II Diabetes participants at greater risk for severe depression and non-adherence to outpatient HD treatment schedules?
   e. Do participants with multiple co-morbidities including diabetes and hypertension demonstrate higher levels of depression and HD schedule non-adherence?
   f. Do some ethnic groups score higher on the BDI-II and have high numbers of non-adherent missed outpatient HD treatment minutes?
2. What are primary types of depressive symptoms evident in the participants as evidenced by their completion of the BDI-II in the following non-somatic categories?
   a. Suicidal ideation.
   b. Feelings of self-dislike.
   c. Feelings of worthlessness.
   d. Lack of enjoyment of activities previously enjoyed.

Purpose of the Study

The purpose of this study is to determine whether a relationship exists between high levels of depression and increased numbers of missed and shortened outpatient HD treatment minutes. Knowledge gained about depression and non-adherence to outpatient HD treatment schedules may lead to measures to positively impact patient outcomes.

Further, nephrology nursing care may be improved as nephrology nurses define their role as informed and effective caregivers. Nephrology nurses are in a unique position to identify HD patients in need of treatment for depression. Nephrology nurses spend a great deal of time interacting with these patients and observing their behavior. Thus, skilled nephrology nursing care is an essential first step in addressing the problem of non-adherence to the treatment schedule that potentially stems from severe patient depression.

Theoretical Definitions

The following definitions clarify terms that are specific to nephrology patient care:
Chronic Kidney Disease (CKD)

Chronic Kidney Disease is a medical condition consisting of the failure of the kidneys to adequately remove wastes such as blood urea nitrogen (BUN) and creatinine (Cr) from the blood. Kidney function is best measured in terms of the Glomerular Filtration Rate (GFR). The GFR is calculated from the results of the serum creatinine test, patient age, race, gender and other factors. A GFR below 15 indicates the necessity to initiate renal replacement therapy, i.e. hemodialysis, peritoneal dialysis, or transplantation (National Kidney Foundation, April 23, 2008).

Outpatient Hemodialysis (HD) Treatment and Schedule

Outpatient hemodialysis (HD) is a treatment that is typically performed three times per week for approximately three to four hours per treatment. The patient’s blood is accessed either by central venous catheter or a peripheral graft or fistula, a surgical connection between a vein and artery. The patient’s blood is passed through blood tubing, a pump, and a dialyzer, or filter. Wastes including BUN and Cr are removed, and regulation of chemicals such as potassium and calcium also takes place. Further, the blood pH is also normalized through the dialysate, the solution that cleanses the blood. Additionally, excess retained fluid may be removed through hydrostatic pressure. The treatments typically occur in an outpatient setting in which the patient comes into a freestanding outpatient clinic. Some outpatient dialysis clinics may also be hospital-based, but freestanding clinics are most common. The clinics are staffed by registered nurses and patient care technicians.
**Outpatient Hemodialysis Patient Demographics**

The two leading causes of CKD are diabetes and hypertension. Diabetes is the single leading cause of kidney failure in the U.S., accounting for about 38.4% of people who start treatment for kidney failure. Hypertension causes approximately 24.8% CKD cases (United States Renal Data Services, March 8, 2009).

Some ethnic groups including African Americans, Hispanic Americans, Asian, Pacific Islanders, and American Indians are at greater risk for diabetes and hypertension. Consequently, individuals belonging to these ethnic groups also have a higher risk for CKD (National Kidney Foundation, March 8, 2009).

Because of the slowly progressive nature of kidney disease and the decline in kidney function that occurs over time, most CKD patients on HD are older. The median age of new patients beginning treatment for CKD is now 64.4 years (United States Renal Data Services, March 8, 2009).

While CKD affects both men and women, men are somewhat more likely to develop CKD. Approximately 55.8% of CKD patients are men, and approximately 44.2% of CKD patients are women (United States Renal Data Services, March 8, 2009).

**Non-adherence to Outpatient Hemodialysis Treatment Schedules**

Non-adherence to the outpatient HD treatment schedule consists of missed or shortened treatments which deviate from the physician-prescribed treatment schedule. Most patients will require between two and one-half and four hours of treatment and three treatments per week. The patient's prescribed schedule is individual and is ordered by their nephrologist. The prescribed schedule is determined by the physician in order to
provide the most effective level of treatment for the patient. Non-adherence to the schedule may be detrimental to the patient’s clinical outcomes. For the purpose of this study, non-adherence to the outpatient HD treatment schedule will be represented by the number of non-adherent missed treatment minutes.

**Depression**

The Diagnostic and Statistical Manual of Mental Disorders 4\textsuperscript{th} edition (DSM-IV) defines depression as a loss of pleasure or interest for two weeks, accompanied by five or more psychological, somatic and behavior symptoms (American Psychiatric Association, 1994). Symptoms associated with major depression include sadness, emotional inhibitions, lack of energy, sleep disturbances, loss of concentration, intense guilt, and thoughts of suicide or death. The need for identification and treatment of depression has more recently been emphasized due to its impact on CKD patient quality of life and clinical outcomes (Chilcot et al, 2008).

**Assumptions**

The assumptions essential to the success of this research were:

1. The participants completed the BDI-II truthfully.
2. The Principal Investigator’s assessment of the cognitive functioning of potential participants was accurate in terms of excluding potential participants with dementia.
3. The Principal Investigator accurately scored the BDI-II according to the authors’ scoring instructions.
4. The Principal Investigator accurately reviewed each participant’s records to tally the number of non-adherent missed treatment minutes and to record demographic and medical information.

Summary

Non-adherence to outpatient HD treatment schedules remains a continuing issue in the care of CKD patients. The negative clinical implications and reduced quality of life associated with missed and shortened treatments is significant and should be addressed.

Additionally, the potential relationship between depression and non-adherence to the treatment schedule continues to be unclear and requires further investigation. Should depression indeed be shown to be related to non-adherence to treatment schedules, identification of depression and intervention by the treatment team, including the nephrology nurse, becomes increasingly important.

This research will clarify the prevalence of depression in one outpatient HD clinic and will also further elucidate the number of non-adherent missed outpatient HD time among the participants. Further, implications for appropriate nephrology nursing interventions will be discussed.
Chapter 2

REVIEW OF THE LITERATURE

Introduction

This chapter addresses adherence to the treatment schedule in outpatient HD patients, the issue of depression in these patients, and nephrology nursing care for outpatient HD patients. The detrimental effects of non-adherence to the treatment schedule are reviewed. The relationship between depression, a common psychological problem present in this patient population, and non-adherence to the treatment regimen are explored. Additionally, the issue of screening these patients for depression is presented. Further, recommendations for nephrology nursing care are discussed in terms of identification of depressive symptoms in outpatient HD patients. Finally, the importance of nephrology nurse referrals for evaluation of depressive symptoms in their patients is reviewed.

Adherence to Outpatient HD Treatment Schedules

The importance of Adherence to the Outpatient HD Treatment Schedule

Adherence to the treatment regimen is shown to result in optimal patient outcomes in terms of morbidity and mortality (Leggat, 2005). Chronic Kidney Disease patients on outpatient HD must closely adhere to a treatment regimen that involves dietary and fluid restrictions, medications, and appointments that are typically three times per week for the HD treatment. Additionally, the patient often has appointments with the nephrologist on occasion, which must be kept. The outpatient HD treatment replaces the function of the diseased kidneys and allows the patient to survive in spite of CKD.
Removal of fluid that is retained, removal of waste products consisting of blood urea nitrogen and creatinine, and correction of electrolyte imbalances and pH are among the many benefits of the HD treatment (Lancaster, 2001).

While the treatment regimen may certainly be considered difficult to follow in many respects, the consequences of non-adherence are indeed serious and potentially life-threatening. Missed or shortened treatments deprive patients of the opportunity for removal of excess blood urea nitrogen, creatinine, and fluid. Further, resolution of electrolyte imbalances and pH regulation are compromised if the patient dialyzes less than the prescribed treatment time or misses treatment. Additionally, the patient may miss doses of medications that treat anemia of CKD and renal osteodystrophy, and bone disease of CKD. Patients who miss or shorten their treatments may also begin to suffer from many of the unpleasant and potentially life-threatening effects of being under-dialyzed including fatigue, nausea and vomiting, cardiac dysrhythmias, and fluid overload (Lancaster, 2001). Missed and shortened treatments can also limit the patient’s contact with health care providers such as the nephrology nurse and nephrologist. Significant changes in the patient’s condition may remain undetected when the opportunity for assessment and consultation with the nephrology nurse and nephrologist is missed. Thus, the importance of adherence to the treatment schedule cannot be overemphasized.

*Theories regarding factors contributing to non-adherence*

Given all that is known about the potentially life-threatening consequences of non-adherence to the treatment regimen and the prescribed schedule in particular, the
question of why patients choose to miss or shorten their treatments arises. Patient teaching by caregivers typically includes information about the increased morbidity and mortality associated with missed or shortened treatments. Patients are frequently required to sign documents indicating that they are choosing to terminate their treatment early against medical advice, and a summary of the potential consequences of early termination of treatment is included in these documents for their review. While patients have been made aware of the risks of missed or shortened treatments, many, nevertheless, continue to be non-adherent to the schedule.

There are a number of theories regarding the causes of non-adherence. Potentially contributing factors include a knowledge deficit, lack of resources, side effects of diet, treatment and medications, denial, poor relationships with the healthcare team, belief systems, and psychosocial variables. These factors may collectively be involved in non-adherence (Lancaster, 2001).

Non-adherence is typically manifested in several ways. Missed appointments, unused medications, abnormal laboratory values, acknowledged non-adherence, persistence of symptoms, and suicidal gestures have all been cited as typical manifestations of non-adherence. In fact, medication non-adherence, self-starvation, treatment non-adherence, dietary non-adherence, and dangerous behavior such as drinking and driving have been identified as subtle signs of suicidal behavior, a typical manifestation of non-adherence (Lancaster, 2001).
Treatment schedule non-adherence

Non-adherence has been noted in the outpatient HD patient population in many aspects of the treatment regimen. Some of the primary areas of non-adherence that are addressed in research include fluid restrictions, medication adherence, and dietary recommendations in addition to the treatment schedule. Non-adherence remains an obstacle to optimal patient outcomes in the outpatient HD setting (Lancaster, 2001).

The prevalence of non-adherence in the outpatient HD setting has not been established and is dependent on the method used to define non-adherence (Leggat et al., 1998, Leggat, 2005; Sensky et al., 1996). Leggat noted that the prevalence of non-adherence ranged from 2% to over 50% due to variations in the methods that define non-adherence. The scope of the problem remains unclear due to inconsistencies in the parameters used to define non-adherence.

A large volume of research has been done regarding treatment schedule non-adherence, and there is not a consensus on how missed time is tabulated. For the purposes of this study, missed time is tallied in minutes because not all patients have the same prescribed treatment duration. Furthermore, noting the number of shortened treatments is not very useful because patients can shorten treatments by a few minutes or by longer periods of time. Moreover, tallying the minutes of non-adherent missed treatment time permits more meaningful statistical analysis. The Pearson Product Moment Correlation must be completed with ordinal data, thus recording the non-adherent missed minutes better suits the correlational design of this study. The tabulation
will include the total non-adherent missed treatment minutes for both missed and shortened treatments.

*Early Research on Treatment Schedule Non-Adherence*

One early research study measured non-adherence in terms of missed treatments and compared patients in the United States with those in Sweden and Japan. This study concluded that 35% of the American patients missed at least one treatment in a six month period, while it was rare for Japanese or Swedish patients to miss even one treatment in a six month period (Bleyer et al., 1999). This finding suggests that cultural differences may influence treatment schedule adherence.

Other research involving missed and shortened treatments as a measure of non-adherence was conducted by Sherman (1996) and included 860 HD patients from several dialysis centers for a one month period. In this study 32.3% of patients shortened treatments and 7.6% skipped one or more treatments. The prevalence of schedule non-adherence is evident in this research.

With respect to shortened treatments, Rocco and Burkart (1993) conducted a large scale investigation of the reasons for early termination of treatment. The researchers found that 6.4% of patients who terminated treatment early did so related to non-adherence. The authors proposed that this knowledge is useful for designing programs intended to reduce the number of early sign-offs in HD patients.

Ifudo et al. (1996) stressed the appropriateness of using missed sessions as an index of non-adherence because the patients receive insurance coverage upon being diagnosed, and there is no confounding variable of cost involved in HD for CKD. Cost is
a confounding variable in assessment of adherence to treatment for other diseases not automatically leading to the provision of insurance coverage.

Survival analyses were completed by Leggat et al. (1998) with regard to missing and shortening treatments. The researchers concluded that patients who skipped one or more sessions per month had a relative risk of mortality of 1.25, indicating a 25% greater risk for death in the next two years compared to patients who did not miss sessions. Ten percent higher mortality was associated with each skipped session.

Kimmel et al. (1998) also defined non-adherence as shortening and/or skipping sessions. In a sample of 295 dialysis patients, the researchers found that increased behavioral adherence, along with other psychosocial variables, was associated with decreased relative mortality risk. This study along with the previous one confirms the relationship between mortality and treatment schedule adherence.

Hailey and Moss (2000) reviewed the literature of compliance behavior in HD patients and proposed that investigation of the attitudes and beliefs of patients that are associated with non-adherence may be useful. Further, they proposed that sociodemographic factors are not amenable to planned intervention and, while these types of factors are interesting, their value is somewhat limited. The researchers also suggested that further research is necessary with regard to person by context interactions. This framework proposes that patient adherence may be predicted by patient characteristics only under certain circumstances. Finally, the investigators noted that very few studies have been conducted with respect to increased adherence and proposed that interventions be developed and tested that use person by context interaction framework.
Vermeire et al. (2001) also reviewed the literature regarding patient adherence to treatment. The researchers stressed the importance of the concordance model in which the patient acts as a decision maker. Further, the investigators emphasized the importance of professional empathy. Close doctor-patient relationships and patients’ health beliefs are very important in this model.

Current Research on Treatment Schedule Non-Adherence

One of the more recent studies regarding adherence in HD patients and peritoneal dialysis patients concluded that smoking, a marker of the priority placed on health status, and intrusiveness/control issues should be addressed in intervention efforts to improve adherence. The investigators proposed that underlying psychosocial issues are predictors of non-adherence (Kutner et al., 2002).

Denhaerynck et al. (2007) reviewed the literature regarding the prevalence and consequences of non-adherence to HD regimens. The literature review noted two obstacles to research on non-adherence: inconsistencies in definitions and invalid measurement methods. Additionally, the researchers also emphasized that non-adherence is a common problem and is associated with increased morbidity and mortality. Further, the researchers stressed that attendance at prescribed sessions are an essential element of the management of CKD.

Other recent research into non-adherence involved cognitive function and adherence of older adults undergoing HD (Hain, 2008). Because the majority of HD patients are elderly, Hain stressed the importance of considering cognitive impairment as a contributing factor to non-adherence. Older patients may be less likely to understand
the consequences of missed or shortened treatments due to their cognitive impairment and may be more non-adherent to the treatment schedule.

Obialo et al. (2008) also analyzed the effect of the treatment schedule on adherence. Patients typically dialyze on Monday, Wednesday, and Friday or Tuesday, Thursday, and Saturday. Patients were much more likely to skip treatment on Saturdays than they were Monday through Friday. This finding suggests that the treatment schedule is also a factor in non-adherence. When Saturday non-adherence is noted, a schedule change to Monday, Wednesday, and Friday may reduce the non-adherence.

Nursing Care of Non-adherent Outpatient HD Patients

Morgan (2000) reviewed the literature regarding methods to improve adherence to the treatment regimen among HD patients. Morgan noted that behavioral approaches, education, and primary nursing are interventions that have been researched. Furthermore, because each patient is unique, and demographic characteristics do not consistently predict adherence for individual patients, the nephrology nurse must spend time with the patient on a regular basis to understand the factors of non-adherence. Therefore, interventions must be individualized by the nephrology nurse for the benefit of each patient.

In further consideration of the nurse/patient relationship, the interaction between nephrology nurses and their patients was described as similar to a psychotherapeutic patient/therapist relationship (Morehouse, Colvin, & Maykut, 2001). The investigators also stressed the individuality of each patient, and also emphasized the importance of time spent between nephrology nurses and their patients in order to achieve optimal
patient outcomes. This finding also concurs with the previously mentioned study by Morgan.

One of the most recent studies with regard to strategies to improve adherence to the treatment regimen also stressed the importance of the nephrology nurse. Through strong relationships of support with the patient, the nurse can identify barriers and offer strategies to help patients improve adherence (Kammerer et al, 2007).

Summary

Non-adherence to the HD treatment schedule remains an impediment to the care of CKD patients. In spite of the potentially life-threatening consequences of missed and shortened treatments, many patients persistently fail to adhere to the schedule. The prevalence of the problem has not been established primarily because of inconsistency in the method of defining non-adherence. In recent years a great deal of research has been completed to attempt to establish the prevalence of treatment schedule non-adherence. Unfortunately, very little investigation has been carried out regarding interventions to improve adherence. Further research is necessary to establish the factors involved in schedule non-adherence and interventions to reduce this problem. Nephrology nurses are in an excellent position to address non-adherence in their patients.

Depression in CKD Patients on Outpatient HD

*Depression and CKD as a chronic illness*

Depression merits considerable consideration with respect to non-adherence to the treatment schedule in CKD patients on outpatient HD. Depression is clearly associated with chronic illness (Symister & Friend, 2003). Chronic Kidney Disease is an ongoing
disease process that is never cured. While CKD is treated with HD, peritoneal dialysis, or transplantation, it requires life-long treatment and renal replacement therapy for survival. Moreover, CKD patients often have numerous co-morbidities such as diabetes or hypertension that further contribute to their chronic health problems (Lancaster, 2001).

**Diabetes**

Diabetes is one chronic illness that must be included in a discussion of depression and CKD. Approximately 20-40% of all CKD cases result from diabetes Since diabetics have been shown to have significant levels of depression (Lancaster, 2001), high levels of depression are to be expected in the CKD patient population.

**Screening for depression**

Screening has been advocated as a means of evaluating depression in CKD patients on outpatient HD. The use of screening tools allows the problem to be measured and provides valuable information about the degree of depression patients are experiencing. This information can then be utilized to determine when intervention may be necessary (Watnick et al., 2005).

Watnick et al. (2005) described several screening tools that have been used to evaluate the prevalence of depression in dialysis patients. Among these tools are the Geriatric Depression Scale, the Zung Self-Rated Depression Scale, and the Diagnostic Interview Schedule. Additionally, the Beck Depression Inventory (BDI) and the Patient Health Questionnaire (PHQ-9) have been validated and are considered to meet the “gold standard” for depression screening in the dialysis center.
Nursing Care of Outpatient HD Patients Experiencing Depression

Some more recent research has focused on nephrology nursing interventions to address depression in CKD patients on outpatient HD. Two of the most comprehensive and well-developed models are presented in detail.

*Continuous care model*

Rahimi, Ahmadi, and Gholyaf (2008) have made recommendations regarding nursing care of outpatient HD patients who are believed to be experiencing depression. Through a qualitative triangulation method, Ahmadi (2001) developed the continuous care model in Iran that is a native model for that culture. A dynamic and continuous care relationship is established between the patient and nurse to increase awareness, caring performance in nurses, and quality of life in patients. The model consists of four stages: orientation, sensitization, control, and evaluation. Patients were screened with the short-form Depression Anxiety Stress Scales (DASS-21), and the questionnaire was repeated after application of the continuous care model. Additionally, counseling and group discussion were facilitated, and problems were identified. Nurses then sensitized patients about the problems, and the model was continued through the control stage. Evaluation was ongoing throughout the implementation of this model. The DASS-21 questionnaire was repeated after application of the continuous care model.

Results from this study involving the continuous care model of nursing care indicated a significant difference in levels of stress, anxiety, and depression among the participants. The research suggests that close, dynamic and interactive exchanges, and relationships between patients and nephrology nurses lead to reduction of stress, anxiety,
and depression in the outpatient HD patient population. Further research should be completed to determine whether this model may be applied in other settings and whether the interventions are universally applicable among other more heterogeneous patient demographic groups.

*American Nephrology Nurses' Association Recommendations*

The American Nephrology Nurses' Association (ANNA) has recently addressed the issue of depression in dialysis patients through training modules that guide nephrology nursing practice. The modules educate nephrology nurses in identifying depressive symptoms in their patients. Major depression or clinical depression is defined as a complex set of physical and emotional symptoms that differentiates itself by its intensity and duration (American Psychiatric Association, 1994). A mnemonic “SIG E CAPS + Mood” is proposed to assist nurses in identifying depressive symptoms:

- “S” refers to sleep (insomnia or hypersomnia),
- “I” indicates interests (diminished pleasure or participation),
- “G” refers to guilt (excessive or inappropriate guilt: feelings of worthlessness),
- “E” stands for energy (loss of energy or fatigue),
- “C” refers to concentration (diminished concentration or indecisiveness),
- “A” indicates appetite (decrease or increase in appetite; weight loss or gain),
- “P” stands for psychomotor (agitation or retardation), and
- “S” refers to suicide (recurrent thoughts of death, suicidal ideation or suicide attempt) (American Nephrology Nurses Association, 2007).
In addition to identification of these depressive symptoms, ANNA advocates a formalized screening program that identifies depressed patients so that interventions can be offered to alleviate patients’ suffering and improve their quality of life. Formalized screening involves the use of screening tools that may be administered to patients who receive outpatient HD. ANNA also recommends the use of the Beck Depression Inventory (BDI) as well as the Patient health Questionnaire (PHQ-9) because these tools have been validated and found to be most effective in screening CKD patients (American Nephrology Nurses Association, 2007).

When implementation of a formal screening program is not possible in a dialysis clinic, ANNA recommends that nephrology nurses ask the following two questions in which a positive answer merits a complete assessment for depression:

1. Over the past two weeks, have you felt little interest or pleasure in doing things?
2. Over the past two weeks, have you felt down, depressed, or hopeless?

By simply asking these questions, the nephrology nurse can gain a great deal of insight into the patients’ state of mind in terms of depression.

The Role of the Nephrology Nurse in Referring Patients with Depressive Symptoms for Evaluation

Additionally, the close therapeutic relationship between nephrology nurses and their patients provides insight into the emotional state of the patient. Nurses may detect subtle changes in demeanor or behavior that indicate potential depression.
Because nephrology nurses see their patients so frequently and interact with them during the treatment, the nurse is in an excellent position to intervene when depressive symptoms or behaviors that warrant concern are noted. While nephrologists, renal social workers, and dieticians also frequently see the patients, the nurse has the most frequent contact with these patients. The role of the nephrology nurse in referring patients with depressive symptoms for evaluation is crucial because the nurse may be the first member of the healthcare team to detect patients’ depression.

Summary

Adherence to outpatient HD treatment schedules has been analyzed a great deal over the years. Non-adherence to the schedule has been associated with increased patient morbidity and mortality. While patients are aware of the potential consequences of treatment schedule non-adherence, patients continue to miss or shorten their treatments.

Depression has been proposed to be potentially associated with decreased treatment schedule adherence. Close relationships between nephrology nurses, screening, and nurse referrals to appropriate mental health professionals are notable interventions to mitigate depressive symptoms in these patients.
Chapter 3

THEORETICAL FRAMEWORK

Introduction

The framework of psychological stress and the coping process will be combined with novice to expert nursing practice to address the issues of non-adherence to the treatment schedule and depression. These models are applicable to the non-adherence issue and nursing care for CKD patients. Psychological stress and coping was first described by Richard Lazarus of the University of California, Berkeley (Lazarus, 1966). Non-adherence to the treatment schedule may be interpreted as a type of coping in this patient population. The response of the nurse to this type of seemingly maladaptive patient coping may be more clearly understood when viewed in terms of Patricia Benner’s novice to expert nursing practice framework (Benner, 1984).

Illness, Psychological Stress, Emotion, and Coping

Stress is defined in many ways leading to multiple interpretations of just exactly what “stress” is. Endocrinologist Hans Selye (1936) was the first to define stress as the perceptions and responses of humans trying to adapt to the challenges of everyday life. Lazarus (1966) has proposed that regardless of the definition selected “we must identify the external and internal forces or stimulus conditions of stress reactions, and the intervening structures and processes that determine when and in what form the stress reactions will occur” (p. 13). Lazarus (1966, p. 27) views stress as an area of study that includes the physiological, sociological, and psychological phenomena and their respective concepts.
Clearly stress is expected when a patient is given a diagnosis of CKD and informed that the treatment options include HD, peritoneal dialysis, transplantation, or conservative care in which the patient may be treated to receive medical support that does not include renal replacement therapy. When faced with a life threatening condition that dramatically alters everyday living, the CKD patient experiences physiological, sociological, and psychological events that may be stressful. Additionally, CKD patients may already be dealing with other co-morbid conditions such as diabetes and hypertension, the two leading risk factors for CKD (National Kidney Foundation, 2008).

Lazarus (1999) has discussed the unity of stress, coping, and emotion. Coping is interpreted to be an integral part of emotional arousal. The concepts of stress, emotion, and coping belong together and form a conceptual unit. Figure 1 illustrates the cyclical interaction of the concepts of chronic illness (CKD), stress (CKD treatment regimen), emotion (depression), and coping (maladaptive coping/non-adherence). CKD leads to stress as the patient attempts to follow the treatment plan, emotional distress in the form of depression may appear, and maladaptive coping manifests itself in the form of non-adherence. Non-adherence in turn leads to further illness in these patients. Lazarus notes that some aspects of chronic illness do not necessarily bring about stress or depression, and a relationship between stress, emotion, and health has not been clearly defined, Lazarus has noted three main kinds of influences on health. Stress and coping affect health by changing the neurochemistry of the body, generating dangerous or damaging
Figure 1. The Potential Relationship Between CKD, Stress, Potential Depression, and Treatment Schedule Non-Adherence.
transactions with environmental conditions. Failure to regulate emotional distress may result. Furthermore, the adoption of a lifestyle that represents physically harmful ways of coping with stress, as in smoking, drinking, drug abuse, or taking excessive physical risks may result. In the case of the CKD patient, the harmful ways of coping manifest as non-adherence to the treatment regimen.

When facing CKD, patients must cope with the challenges of the disease process and treatment modality selected. Lazarus described the coping process as a response to a perceived threat. The individual makes an appraisal of a threat and attempts to respond accordingly. According to Lazarus (1966), “appraisal does not imply awareness, good reality testing, or good adaptation. It implies that thought processes are involved, not the kind of thought. A belief may be unwise, a perception inaccurate, a coping solution to threat primitive and unsuccessful, yet still be cognitive... coping can be based on cognitive processes, yet non-adaptive or even bizarre” (p 250-251).

While studies have shown that patients who have fewer missed and shortened HD treatments have better outcomes in terms of morbidity and mortality (Lancaster, 2001), patients may feel that they “know (their) body and know when (they’ve) had enough (Hemodialysis Patients, personal communication, October 31, 2008). While the belief that shortening or missing treatments is not detrimental is false, patients often choose to adopt this belief and cope in this maladaptive way. Patients may feel overwhelmed in response to the stress of chronic illness and are affected emotionally by stress. Consequently, they cope as best they can, although their coping is not always in their best interest.
Novice to Expert Nursing Practice Model or Framework

The novice to expert nursing practice framework (Benner, 1984) is applicable to nursing practice in the nephrology nursing setting. The Dreyfus model of skill acquisition is integral to the novice to expert framework (Dreyfus, 1982.) Thus, distinct levels of skill or stages may be observed in nursing practice: novice, advanced beginner, competent, proficient, and expert. These stages are also present within the specialty of nephrology nursing.

The novice stage is described as a time for learning context-free rules in order to function in an unfamiliar setting. An inexperienced HD nurse must learn basic principles of HD. Additionally, the novice HD nurse must become familiar with the CKD patient population and their needs and concerns if the nurse has no experience in caring for these patients.

An advanced beginner HD nurse has begun to demonstrate marginally acceptable performance. Further, at this level the nurse may have begun to recognize some meaningful patterns of clinical practice, however the nurse is unable to function independently without support from a more highly skilled nurse. At this level, for example, the nurse might be able to initiate the HD treatment, but might require assistance should any unusual complications arise.

After the novice and advanced beginners levels have been mastered, the nurse may be considered competent. Competency is usually achieved after two to three years of experience. Long-range goals and plans of action are apparent, however the nurse
remains slow and less flexible than more highly skilled peers. Competent HD nurses might have the skill to function in a charge nurse role in the clinic setting.

After approximately three to five years of clinical practice, a nurse becomes proficient. Situations are perceived as a whole rather than in elements or aspects. Perceptions are very important, and performance is guided by maxims. Recent events and experience allow perspectives to “present themselves.” A proficient HD nurse might function in an administrative capacity overseeing the operations of a clinic.

An expert level of nursing practice is typically achieved after five or more years of clinical practice. The expert nurse has an intuitive grasp of each situation related to an enormous background of experience. The nurse at this level is recognized as an authority in the area of specialty and may provide consultation to other nurses or physicians. Additionally, the expert nurse often fulfills an advanced practice role and has an interest in research, quality improvement, and often graduate education.

The level of nursing practice may influence the nurse’s perspectives and objectives in the outpatient HD setting. Specifically, the nurse’s perception of patient and nurses roles and patient behaviors and actions are greatly influenced by the practice level of the nurse. Nurse and patient objectives and goals set by novice HD nurses may differ greatly from those of an expert HD nurse. Significantly, the nurse’s perception of patient non-adherence in general as well as treatment schedule non-adherence may be affected by the nurse’s level of practice.
Psychological Stress and Coping Framework and Novice to Expert Nursing Practice Model Applied to Treatment Schedule Non-adherence and Potential Depression

Because the expert HD nurse is equipped with a great deal of experience and intuition related to care of CKD patients, the expert nurse may be more likely to detect emotional distress and maladaptive coping. Because of the high level of clinical and patient assessment skills in the expert nurse, less focus must be placed on the completion of the routine tasks associated with the procedure. Additionally, the expert nurse is more attuned to patients’ overall emotional states and responses to illness. In terms of non-adherence, the expert nurse has a more profound understanding of the relationship between illness, stress, emotion, and coping related to non-adherence. After many years of interacting with patients as well as an improved knowledge base that frequently includes graduate level education, expert nurses are more intuitive regarding the overall well-being of the patient. The expert nurse is often more inquisitive about the patient treatment schedule non-adherence and is motivated by an increased desire for the best possible patient outcomes. The expert nurse is more likely to intervene upon noting patient treatment schedule non-adherence.

The novice to expert model of nursing practice suggests that all HD nurses should aspire to practice at the expert level with regard to patient treatment schedule non-adherence. Further, expert nurses in supervisory positions must carefully monitor and mentor novice nurses at lower levels of practice in the HD setting. Should a patient begin to miss and/or shorten treatments on a regular basis, further investigation is warranted.
Documentation of missed and shortened treatments and patient evaluation by an expert HD nurse will, undoubtedly, serve to improve patient outcomes.

**Summary**

The complex interaction of chronic illness, stress, and emotion is a barrier to adherence in outpatient HD patients. Maladaptive coping stems from erroneous health beliefs accompanied by depression. The patient disregards the consequences of non-adherence and may believe that missing or shortening treatments will have no detrimental effects.

Because of their close relationships and frequent contact with patients, nephrology nurses are in a good position to identify non-adherence and maladaptive coping. Nephrology nurses must strive to practice at an expert level providing support when patients are struggling to follow the treatment regimen.
Chapter 4

METHODOLOGY

Overview

This correlational research was designed to explore the relationship between depression and patient non-adherence to outpatient HD treatment schedules. The Beck Depression Inventory II (BDI-II) was administered to patients at a chronic, outpatient HD clinic. The inventory was scored according to the tool provided, and participants' scores were recorded. A chart review was also conducted for each participant to obtain demographics and medical history. Data analyses were performed to determine the degree of correlation between higher BDI-II scores, indicating more severe depression, and other participant factors such as number of missed minutes due to treatment schedule non-adherence, gender, age, ethnicity, and history of diabetes and hypertension. Because the literature review revealed a dearth of prior research regarding depression related to non-adherence to outpatient HD treatment schedules, this study will serve to define the scope of the problem and determine whether a correlation does indeed exist. Additionally, specific subgroups which are at increased risk for depression and schedule non-adherence may be identified.

Variables

Primary Variables of Interest

One of the main variables of this study is the number of missed and shortened outpatient HD treatments. Participants have a medical diagnosis of End Stage Renal Disease that necessitates renal replacement therapy. All participants in this study have
selected outpatient HD as the treatment modality. Therefore, participants are required to adhere to the clinic treatment schedule for optimal outcomes.

A second key variable is the degree of depression indicated by the participants' responses to the BDI-II. Each participant received a score based on the questionnaire responses. Higher scores indicated higher levels of depression.

*Other Variables of Interest*

Other variables of interest include gender, age, ethnicity, history of hypertension, history of diabetes, and history of depression. These individual participant characteristics could influence the BDI-II scores and degree of depression indicated.

*Operational Definitions*

**Depression**: A disorder that interferes with daily life, normal functioning, and causes emotional pain for both the person with the disorder and those who care about him or her. Depression is a common but serious illness, and most that experience it need treatment to get better (American Psychiatric Association, 1994).

**Stress**: A psychological and physical response of the body that occurs whenever we must adapt to changing conditions, whether those conditions be real or perceived, positive or negative (Lazarus, 1966).

**Coping**: The process of managing taxing circumstances, expending effort to solve personal and interpersonal problems, and seeking to master, minimize, reduce, or tolerate stress or conflict (Lazarus, 1966).

**Adherence**: The extent to which an individual complies with the doctor's orders with respect to medical treatment (Lancaster, 2001).
Sample

This study involved convenience sampling of outpatient HD patients at a Sacramento County clinic. Participants were assigned subjects numbers as their BDI-II questionnaires were returned by mail to the Principal Investigator (PI).

Selection criteria

Participants in the study were outpatient HD patients at least 18 years of age who had been receiving treatment for at least six months. Additionally, the participants must have been able to complete the BDI-II and return the questionnaire by mail. Thus participants self-selected in participating in this study. Prospective participants demonstrating dementia were excluded from the study. Potential participants were evaluated by the PI and were required to be oriented to person, place, time, and situation in order to be included in the study.

Demographics

The participants were equally divided in terms of gender with 23 males and 23 females respectively. The majority of participants were Caucasian (n = 32) subject. The majority of the participants were over 60 years of age (n = 26) (see Table 1).

Human Subjects/Agency Research Approval

This study was approved by the Human Subjects’ Committee at the Division of Nursing, Sacramento State University. Additionally, approval was obtained from the research division of the agency prior to the start of the study.
Table 1
Demographic and Co-morbidity Data

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Data Collection

Data collection consisted of the BDI-II questionnaires and a chart review. The chart review included participant age, gender, ethnicity, length of time on outpatient HD, history of hypertension, history of diabetes, history of depression, and medications.

Procedures

Study participants included adult outpatient HD patients over 18 years of age. The sample included participants who have been receiving outpatient HD for at least six months. The Beck Depression Inventory-II (BDI-II) was mailed to potential participants who receive treatment at the Sacramento County outpatient HD clinic. The informed consent and an explanatory cover letter were included with the BDI-II along with a list of resources for potentially suicidal participants. Only participants who returned the signed informed consent and completed BDI-II were included in the study. Posters were displayed in the clinic, and flyers were distributed to potential participants at the clinic to promote participation in the study.

Participants were mailed a copy of the informed consent document, which is included in Appendix A, for their review and signature along with the explanatory cover letter (Appendix B) and depression counseling list (Appendix C). Participants were given an opportunity to ask any questions by calling the PI at the telephone number included in the informed consent document.

After the signed informed consent and completed BDI-II were returned by the participants, their names were placed on a list and randomly assigned subject numbers. The list of participant names and corresponding subject numbers were placed
in a locked file at the home of the PI to be retained for five years. All questionnaires and data collected were marked with subject numbers. All Health Insurance Portability and Accountability Act guidelines were followed with regard to protection of participant information. Documentation of permission to review participants' medical records from the agency was obtained.

The study involved minimal risk associated with the completion of the BDI-II. In the event that participants became more aware of depressive symptoms and experienced some degree of emotional distress associated with the completion of the BDI-II, they were mailed contact information for the National Suicide Prevention Lifeline as well as a list of local counseling services and corresponding phone numbers. The study is a quantitative correlational design. Specifically, the BDI-II to measure depression was completed by the subjects. Further, a retrospective component was included as data were collected from participant charts. The research was conducted in a single outpatient HD center with the PI as the funding source.

The purpose of the study was to determine whether there is a relationship between depression and non-adherent missed treatment minutes in CKD patients receiving outpatient HD. Additional specific objectives of this study included identification of patients who frequently miss or shorten their outpatient HD treatments, and identification of the signs and symptoms of depression in this patient population. Participant charts were reviewed to collect data about numbers of missed and shortened treatments corresponding to the subject study number. A tabulation of the total number of non-adherent missed treatment minutes was completed. Additionally, participant data such as
age, ethnicity, participant medical problem list information, psychiatric history, and medical history regarding hypertension and diabetes were collected. Participant charts were reviewed to collect data about the number of non-adherent missed treatment minutes for a six month period prior to the beginning of the study. The charts were reviewed by the PI, and tallies of missed and shortened treatments were made. Data collection continued for approximately two to three months at the Sacramento County dialysis clinic.

The data were entered into a computer spreadsheet corresponding to the subject study number. The original paper tally sheet and a copy of the original version of the spreadsheet data will be retained in a locked file in the Principal Investigator's home for five years. Participants' scores from the BDI-II were scored according to the authors' guidelines and entered into a computer spreadsheet corresponding to the subject study number.

Response rate

The response rate among the potential participants was 63.9%. Forty six of the 72 potential subjects returned the BDI-II and informed consent. This response rate was excellent and provided an acceptable sample size.

Research Instrument

The research instrument for this research is the BDI-II. This instrument has traditionally been used to measure the degree of depression in End Stage Renal Disease patients who have selected outpatient HD as the treatment modality (Watnick, 2005). The BDI-II measures depressive symptoms and is used as a screening tool. The BDI-II
measures both somatic and non-somatic symptoms of depression. Additionally, subscales are included to determine the primary cause of the depression.

The BDI-II reflects two components of which depression is believed to consist: the affective component (e.g. mood) and the physical or "somatic" component (e.g. loss of appetite). Thus the BDI-II can be separated into two subscales. Determination of the primary cause of a patient's depression is the purpose of the subscales.

*Reliability/validity of the BDI-II*

Scores on the BDI-II have been shown to positively correlate with the Hamilton Depression Rating Scale ($r = .71$), an instrument that has been validated as a useful instrument for assessment of depression. The BDI-II also demonstrates high one-week test-retest reliability ($r = 0.93$), suggesting that it measures more long-lasting affective states than daily mood swings. The test also has high internal consistency ($a = .91$) (Beck et al., 1996).

The affective subscale includes eight items: pessimism, past failures, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal thoughts or wishes, and worthlessness. The somatic subscale involves the other thirteen items: sadness, loss of pleasure, crying, agitation, loss of interest, indecisiveness, loss of energy, change in sleep patterns, irritability, change in appetite, concentration difficulties, tiredness and/or fatigue, and loss of interest in sex. The two subscales were moderately correlated ($r = .57$), suggesting that the physical and psychological aspects of depression are closely related (Steer et al., 1999; Storch, Roberti & Roth, 2004).
**Scoring**

The BDI-II contains 21 questions, and each answer is scored on a scale value ranging from zero to three. The scoring scale is as follows: 0-13: minimal depression; 14-19: mild depression; 20-28: moderate depression; and 29-63: severe depression. Higher total scores indicate more severe depressive symptoms (Beck, et al., 1996). The participant questionnaires will be scored according to the authors' scoring instructions that are provided with the questionnaires.

**Summary**

The relationship between non-adherence to outpatient HD schedules and depression was examined by this research. Through the use of the BDI-II and chart review, greater insights were attained regarding this very important patient care issue. Furthermore, the results of the BDI-II provide insight into the responses of CKD on outpatient HD regarding specific subgroups of depressive symptoms including suicidal ideation, worthlessness, self-dislike, and reduced enjoyment of previously enjoyable activities. This knowledge further assists the nephrology nurse in optimizing patient care outcomes. The nurse is now more aware of the typical types of responses seen in this patient population and may tailor the assessment and interventions accordingly.
Chapter 5

RESULTS

Introduction

The purpose of this study was to determine the relationship between higher levels of depression and greater amounts of missed treatment time due to non-adherence. This chapter details the statistical analyses that were conducted to describe the relationships among the variables. Descriptive and inferential statistics will be presented. The analyses will focus on the relationship between BDI-II scores and non-adherent missed treatment time. Further, the corollary research questions related to participant gender, age, ethnicity and medical history will be addressed as the results of the research is presented. Finally, some of the noteworthy non-somatic depressive symptoms demonstrated by the participants through the BDI-II will be described.

Statistical Methods Employed

Descriptive statistics were utilized to demonstrate the characteristics of the variables of interest. Data were summarized utilizing means for non-adherent missed treatment minutes, prescribed treatment duration, number of treatments per week, age, BDI-II score, age, gender, diagnosis of Type II Diabetes, and diagnosis of hypertension.

A variety of inferential tests were employed. Pearson product-moment correlation tests were used to clarify the relationships among the ordinal variables of interest such as age, BDI-II, and missed treatment minutes. Analysis of variance (ANOVA) and independent means t-tests were utilized to examine the relationship
between ordinal variables and nominal variables such as gender, ethnicity, and the occurrence of hypertension.

Participant Sample

A convenience sample of 46 outpatient HD patients participated in the BDI-II screening and chart review process. Table 1 presents a breakdown of participant characteristics across the demographic categories and morbidity variables examined. On the measure of missed treatment minutes, the score of one participant was an obvious outlier given that the score on this measure (2,055) was more than twice as high as the next highest score (885). Accordingly, the score on this one variable was not included in any analyses. No other outliers in the data set were identified.

Primary Research Question

What is the relationship between non-adherence to the outpatient HD treatment schedule and depression in CKD patients? Do participants who score high and demonstrate severe depression on the Beck Depression Inventory-II also exhibit higher numbers of missed and shortened outpatient HD treatments than those whose BDI-II scores are low and do not demonstrate severe depression?

Table 2 presents the results of the Pearson product-moment correlation tests performed on these and other ordinal measures. Regarding the relationship between non-adherent missed treatment minutes and BDI-II scores, the Pearson product-moment correlation yielded no statistically significant correlation between these variables. This finding was somewhat unexpected because traditionally, non-adherence and depression have been assumed to be related (Lancaster, 2001).
Table 2

**Correlations Between Ordinal Variables of Interest**

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<th>Missed Minutes</th>
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* Correlation is significant at the 0.05 level (2-tailed).
The relationship between these two variables was further explored by comparing BDI-II scores between participants showing the most treatment adherence and those showing the least adherence. An examination of the distribution of non-adherent missed treatment minutes scores indicated that 18 patients (39.1%) had a score of zero on this measure, while 14 patients (30.4%) had missed greater than 100 minutes of treatment over the 6-month period analyzed. When the average BDI score from these groups were compared, participants who missed no minutes had an average BDI score of 9.0 while those who missed greater than 100 minutes had an average BDI of 14.6, a difference that was statistically significant ($t = 2.38, p < .05$). This finding is important because it demonstrates that the participants most adherent to the schedule had significantly lower BDI-II scores than those who missed 100 minutes or more.

Corollary Research Questions

1. Do specific subgroups of participants score higher on the BDI-II and demonstrate higher numbers of missed and shortened outpatient HD treatments?
   A. Are higher levels of depression and greater non-adherent missed treatment time related to gender?

The relationship between men and women in BDI score and non-adherent dialysis treatments was explored. Men showed an average BDI score of 10.4 while women showed an average score of 10.6. As suggested from these small differences, these means were not statistically different. On the issue of non-adherent missed treatment minutes, men scored an average of 100.83 missed treatment minutes while women scored
an average of 155.2 missed treatment minutes. An independent *t*-test verified that these differences were not statistically significant.

B. Are depression and increased numbers of missed and shortened outpatient HD treatments related to age?

As indicated in Table 2, the correlation between age and non-adherent missed treatment minutes was significant (*R* = -.371, *p* < .05). This finding indicates that as age increased, missed treatment minutes tended to decrease. No significant correlation was found between age and BDI score. To further examine the relationship between these variables, patients under the age of 65 were compared with those 65 and older. On the measure of BDI, patients under the age of 65 showed an average score of 11.7 while those patients 65 and older had an average BDI score of 9.1, a difference that was not significant. On the measure of non-adherent missed treatment minutes, those patients under the age of 65 had an average of 181.7 missed minutes while those aged 65 and over had an average of 68.1 missed treatments. Despite the large difference between these means, these differences just missed significance.

C. Are participants with hypertension at greater risk for severe depression and resulting increased numbers of missed and shortened outpatient HD treatments?

D. Are Type I and Type II Diabetes participants at greater risk for severe depression and non-adherence to outpatient HD treatment schedules?
E. Do participants with multiple co-morbidities including diabetes and hypertension demonstrate the higher levels of depression and HD schedule non-adherence?

These issues are addressed by an analysis of the effects of diabetes and hypertension on the BDI scores and non-adherent missed treatment minutes, and an analysis of the interaction between these measures. Because this analysis required an examination of the interaction between the two conditions (hypertension and diabetes), an ANOVA was employed to determine the relationship between the BDI score and non-adherent missed treatment minutes.

On the dependent measure of BDI, patients without hypertension had an average BDI score of 6.7 while patients with hypertension had an average BDI score of 11.2. Despite this apparent difference, the ANOVA found no main effect of hypertension on BDI scores. Likewise, this analysis found no main effect of Diabetes for non-diabetic and diabetic patients, respectively. The means produced by the interaction of these factors on the measure of BDI are presented in Figure 2. An examination of this figure suggests that an interaction could be taking place, with lower BDI scores occurring when there is an absence of both hypertension and diabetes. In other words, the presence of either hypertension or diabetes (or both) leads to an increase in depression compared to patients with neither of these conditions. Surprisingly, the analysis of the interaction failed to reach significance. One possible explanation for this lack of an interaction effect is the small sample sizes in the non-hypertension groups, with \( n \)-values of 5 and 2
Figure 2. Mean BDI Score (+/- SEM) for patients as a function of presence or absence of hypertension and presence or absence of Type I or II diabetes.
for the non-diabetic/non-hypertension group and diabetic/non-hypertensive group, respectively.

Next, a similar analysis was performed examining the relationship between diabetes and hypertension on the dependent measure of non-adherent missed treatment minutes. Despite the appearance of a difference in the means between non-hypertensive patients and hypertensive patients (M = 13.6, M = 147.0 minutes respectively) the main effect of hypertension failed to reach significance. Again, this lack of effect is possibly due to small sample size for the non-hypertensive condition relative to the number of hypertensive participants (n = 7, n = 38, respectively). Likewise the main effect of diabetes failed to reach significance [means of 121.1 (+/- 41.6) and 137.5 (+/- 50.5) for non-diabetic (M = 121.1) and diabetic patients (M = 137.5). Lastly, the means produced by the interaction of these factors on the measure of non-adherent missed treatment minutes are presented in Figure 3, and the interaction failed to reach significance.

F. Do some ethnic groups score higher on the BDI-II and have high numbers of non-adherent missed outpatient HD treatment minutes?

Because there were more than twice as many participants in the largest single ethnic group (Caucasians) than all other groups combined (see Table 1), the data were divided into Caucasians (n = 32) and Non-Caucasians (n = 14) for the purpose of this analysis. On the measure of BDI, Caucasians had a mean score of 9.9 while Non-Caucasians had a mean score of 11.9. An independent t-test failed to show a significant difference between these scores. On the measure of non-adherent missed treatment minutes, Caucasians had a mean score of 116.0 while Non-Caucasians had a mean
Figure 3. Mean Non-Adherence Missed Treatment Minutes (+/- SEM) for patients as a function of presence or absence of hypertension and presence or absence of Type I or II diabetes.
score of 148.9, a difference that failed to reach significance.

2. What are primary types of depressive symptoms evident in the participants as evidenced by their completion of the BDI-II in the following non-somatic categories?

The four most commonly expressed non-somatic depressive symptoms will be discussed below. Although a number of other symptoms were also reported, this discussion will focus on suicidal ideation, self-dislike, worthlessness, and lack of enjoyment of previously enjoyable activities.

*Suicidal ideation*

For this BDI-II item, 8 of the 42 study participants indicated that they “have thoughts of suicide but would not act on them.” This represents 19% of the participants. This finding is particularly alarming in the context of the possible reasons for non-adherence mentioned early in this paper. Specifically, non-adherence has been viewed as a type of suicidal gesture. Thus, non-adherence is the manifestation of underlying suicidal ideation for some patients (Lancaster, 2001).

*Self-dislike*

In this category, 8 of the 42 participants indicated that they have some degree of self-dislike. Four participants responded that they had “lost confidence in themselves,” demonstrating the lesser degree of self-dislike. Three participants indicated that they were “disappointed in themselves,” exhibiting a greater degree of self-dislike. One participant selected the most severe indicator of self-dislike and specified that he “disliked himself.”
Worthlessness

Regarding worthlessness, 12 participants expressed this depressive symptom. This is 28.6% of the total sample. Nine participants indicated that they feel less “worthwhile and useful than they used to be.” Three responded that they feel “more worthless as compared to other people.”

Lack of enjoyment of previously enjoyed activities

Concerning lack of enjoyment of previously enjoyed activities, 21 participants, 50% of all participants, demonstrated this depressive symptom. Four indicated that they “get little pleasure from the things they used to enjoy.” One participant stated that she “can’t get any pleasure from the things previously enjoyed.”

Summary

Concerning the primary research question on the relationship between BDI-II scores and treatment schedule non-adherence, no significant correlation was found through analysis by the Pearson product-moment correlation. However, this research determined that participants who had perfect treatment schedule adherence had significantly lower BDI-II scores than those who missed 100 minutes or more due to non-adherence.

Corollary research questions addressed gender, age, hypertension, diabetes, and ethnicity and effects on BDI-II scores and treatment schedule non-adherence. Participants without hypertension or diabetes had lower BDI-II scores. Among those factors, the absence of hypertension and diabetes correlated with lower BDI-II scores.
Additionally, four common non-somatic depressive symptoms were identified. Suicidal ideation, feelings of self-dislike, worthlessness, and lack of enjoyment of activities previously enjoyed were the most frequently reported.
CHAPTER 6
SUMMARY AND CONCLUSIONS

Introduction

This research study was designed to clarify the relationship depression and non-adherence to the treatment schedule in CKD patients on outpatient HD. Accordingly, the findings will be addressed in this chapter. Additionally, the descriptive and statistical findings of the investigation will be discussed. Finally, study limitations along with implications for theory building, nursing care, and research will be presented.

Overview of the Study

Non-adherence to the outpatient HD treatment schedule is frequently noted among CKD patients. Non-adherence has been linked to increased morbidity and mortality in this patient population (Lancaster, 2001). A number of factors have been implicated in non-adherence among outpatient HD patients (Lancaster, 2001). The current research study investigates the relationship between depression and non-adherence to the treatment schedule. Clarification of this relationship is an essential element of the plan of care for these patients.

In addition, an improved standard of care can be achieved when nephrology nurses are better able to identify depressive symptoms in their patients. Depression screening by nephrology nurses has been advocated as an integral component of nursing practice (American Nephrology Nurses Association, 2007). Moreover, the nurse’s ability to identify patient subgroups who may be at greater risk for depression and non-
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In addition, an improved standard of care can be achieved when nephrology nurses are better able to identify depressive symptoms in their patients. Depression screening by nephrology nurses has been advocated as an integral component of nursing practice (American Nephrology Nurses Association, 2007). Moreover, the nurse’s ability to identify patient subgroups who may be at greater risk for depression and non-
adherence may lead to a higher level of nephrology nursing care. The research, therefore, also addresses patient characteristics including gender, age, the co-morbidities diabetes and hypertension, and ethnicity. Analyses of these patient characteristics in terms of non-adherence and depression provide insight for the nephrology nurse in caring for these patients.

Theoretical Framework

Lazarus' (1966) stress, emotion, and coping model and the novice to expert nursing practice framework (Benner, 1984) were applied to this research in an attempt to clarify potential underlying factors associated with outpatient HD treatment schedule non-adherence. The chronic nature of CKD leads to stress and an emotional response that may include depression. When faced with stress resulting from chronic illness, patients may adopt maladaptive coping behaviors that can lead to exacerbation of the chronic illness.

Benner's novice to expert framework suggests that nurses must analyze patient behaviors in depth and endeavor to determine the underlying factors associated with non-adherence. Nephrology nurses must maintain close relationships with patients in order to detect any changes in patient behavior that may necessitate intervention. Too often, the underlying factors of treatment schedule non-adherence may go undetected by novice nurses. Patients are positively served by improved nursing education regarding depression. Additionally, implementation of depression screening programs by nephrology nurses results in great potential benefit for these patients.
Method

After informed consent was obtained, a convenience sample of 46 CKD patients receiving outpatient HD was screened for depression using the BDI-II, and a chart review was conducted to determine the number of missed treatment minutes due to treatment schedule non-adherence. Additionally, demographic information such as age, gender, ethnicity, insurance status, and medical history was obtained through the chart review.

Descriptive and inferential statistics were utilized to determine the relationship between BDI-II scores and non-adherent missed treatment minutes. Pearson product-moment correlation was conducted with the ordinal data obtained through chart review. No statistically significant correlation was noted between increased depression exhibited in higher BDI-II scores and higher numbers of non-adherent missed treatment minutes. However, when further analysis was conducted to compare those participants who missed no non-adherent minutes with others who missed more than 100 non-adherent minutes, a significant difference in BDI-II scores was noted.

In the ANOVA analysis to determine the interaction of the two most prevalent co-morbidities diabetes and hypertension with BDI-II scores and non-adherent missed treatment minutes, one notable finding was apparent. Those who had neither hypertension nor diabetes had lower BDI-II scores than those with either condition. Thus, patients with one or both of these co-morbidities may be at greater risk for depression.

Further analysis was completed to determine the role of ethnicity with regard to BDI-II scores and non-adherent missed treatment minutes. Because of the homogeneity
of the participants in terms of ethnicity, Caucasians were compared with non-Caucasians through a t-test. Because 69.5% of the participants was Caucasian, they were compared to the other participants of other ethnicity who were grouped together.

Summary of the Findings

Descriptive analysis

Descriptive analysis of the data was utilized to describe the characteristics of the participants, the prevalence of depression as indicated by the BDI-II screening scores, and the number of non-adherent missed treatment minutes. Tables and figures were included to illustrate those characteristics.

The average age of the participants was 60.74. Participant age ranged from 23 to 90, and there was a highly variable range for participant age. The majority of the participants were elderly, a fact that is consistent with the demographics of the dialysis clinic where the study was conducted.

Gender was equally represented in this study with 50% of the participants being female and 50% male. This equal representation of gender is beneficial for study validity.

The average BDI-II score among the participants was 10.45. This result indicates that a mild degree of depression in the participants, and considerable variability was present among the BDI-II screening scores. The finding of mild depression is not unexpected given the nature of the CKD diagnosis and treatment regimen. One concerning response noted among the BDI-II items was among eight participants who indicated that they had thought of suicide but would not act on these thoughts. Several
participants also demonstrated feelings of self-dislike, worthlessness, and a lack of enjoyment of activities that they had enjoyed in the past. In fact 50% of all participants expressed some degree of lack of enjoyment of previously enjoyed activities. Again, a great degree of variability was noted in BDI-II scores which ranged from 1 to 32.

The average number of missed treatment minutes was 168.15. As was the case with the BDI-II scores, a great deal of variability was noted in the number of non-adherent missed treatment minutes. Some participants missed no time due to non-adherence, while others missed hundreds of minutes. Notably, one female participant missed 2055 minutes due to non-adherence and was, therefore, excluded from some inferential analysis as an outlier.

Regarding the co-morbidity hypertension, 73.9% of the participants were diagnosed with hypertension, a percentage that is well above the percentage that is typically present in the CKD patient population overall. This high percentage of hypertensive patients was, therefore, somewhat surprising.

Regarding the co-morbidity diabetes, 32.6% of patients was diagnosed with Type I or Type II Diabetes. This percentage is consistent with the typical 20-40% that is expected in the CKD patient population overall (Lancaster, 2001).

In terms of ethnicity the majority of participants were Caucasian at 69.5%. This high percentage of Caucasian participants is unexpected because CKD typically affects African Americans and Hispanics as well as Pacific Islanders (National Kidney Foundation, 2008).
Inferential Analysis

Inferential analysis of the data was designed to address the primary research question regarding the relationship between depression and a higher degree of non-adherence to the outpatient HD treatment schedule. Additionally, analyses addressed the corollary research questions regarding the role of gender, age, co-morbidities, and ethnicity in depression and non-adherence to the outpatient HD treatment schedule.

Surprisingly, there was no statistically significant correlation between higher BDI-II depression screening scores and higher levels of treatment schedule non-adherence. Participants missing no non-adherent minutes had significantly lower BDI-II scores than those who missed more than 100 non-adherent minutes. Thus, those who are most adherent to the treatment schedule had lower BDI-II scores. This finding suggests that those who are most adherent suffer less depression. Non-adherence of 100 minutes or more was thus a marker of potential depression.

No statistically significant gender difference in depression and treatment schedule non-adherence was apparent. Accordingly, gender is not necessarily an important factor for consideration in depression and treatment schedule non-adherence.

With respect to age, elderly patients 65 and older demonstrated fewer non-adherent missed treatment minutes. However, statistical analysis failed to demonstrate a statistically significant difference between patients less than 65 and those 65 and older. Therefore, age was not a predictor of depression or non-adherence.

While the co-morbidities hypertension and diabetes seem likely to be associated with higher levels of depression and treatment schedule non-adherence, there was no
such correlation in this research. Similarly, no statistically significant difference was found between diabetics and non-diabetics. ANOVA also failed to show a statistically significant relationship between hypertension and diabetes and depression or treatment schedule non-adherence. Accordingly, these co-morbidities are not predictors of depression or non-adherence to the treatment schedule in this study.

Finally, no statistically significant difference was demonstrated between Caucasians and non-Caucasians in terms of depression and non-adherence to the treatment schedule.

Limitations of Study

The results of this study are most useful when the following study limitations are recognized.

1) The findings may be generalized only to similar patient populations. The fact that the participants were primarily Caucasian, and an extremely high number of patients were hypertensive may make the results non-generalizable to CKD patients overall. Additionally, the majority of the participants had private insurance. Participants with private insurance may have more financial resources and higher socioeconomic status than those without private insurance. The high percentage of participants with private insurance, therefore, may also make the results more difficult to generalize.

Individuals experiencing depression may have decreased motivation and be less likely to participate in this type of study. A threat to validity is inherently present because of the potential for exclusion of more highly depressed individuals.
2) Individuals who have been outpatient HD patients for a long period of time may have developed improved coping skills and be less susceptible to the effects of stress. Less non-adherence and lower levels of depression may have developed in these individuals as the years have passed.

3) While the BDI-II is considered the gold standard for depression in outpatient HD patients, the potential exists for inaccurate depression screening. Specifically, outpatient HD patients experience a number of somatic complaints such as sleep disturbance, fatigue, and decreased appetite that can mistakenly be interpreted as depressive symptoms.

4) Participant responses on the BDI-II may have been influenced because the PI is a caregiver in the clinic. Given the fact that the participants have known the PI as a nurse at the clinic for at least six months, the nurse/patient relationship may have influenced the responses on the BDI-II. Participants were aware that the PI would be scoring the questionnaires and might be aware of their responses.

Implications for Theory Building

Lazarus' theories of stress, emotion, and coping are very useful in addressing the issue of depression and non-adherence to the treatment schedule in outpatient HD patients. Additionally, Benner’s theory of novice to expert nursing practice is applicable as a framework for nephrology nursing care of these patients. The importance of clear understanding of the role of depression in non-adherence to the outpatient HD treatment schedule cannot be underestimated. Certainly a number of factors may be involved, however depression is one treatable condition which must be addressed through specific
nursing interventions. Among these interventions are close nurse/patient relationships, depression screening, and referrals for patients demonstrating depressive symptoms. These interventions are integral to expert nephrology nursing practice.

Implications for Research

Further research is indicated with respect to depression and treatment schedule non-adherence. Moreover, a great deal of understanding could be gained through studies that involve the implementation of nurse screening plans in the clinics. Specifically, screening followed by planned interventions as follows: nurse/patient interaction at each dialysis session; monitoring and identification of depressive symptoms; monitoring of treatment schedule non-adherence as a marker of potential underlying depression; referrals to appropriate mental health professionals when indicated; and follow-up screening. This plan of care could greatly improve the emotional state of CKD patients on outpatient HD.

Additionally, a more ethnically diverse group of participants would provide greater insight into potential ethnic differences concerning depression and non-adherence. Such knowledge would be useful for nursing care of patients in high-risk ethnic groups. This study should be replicated with more participants and a more diverse sample in the hope of gaining better understanding into the implications of ethnicity.

A longitudinal study of a large group completed over an extended period of time would be useful to further determine the relationship between depression and treatment schedule non-adherence. This kind of study would provide more meaningful data.
Further research involving depression in these patients is also indicated. Additional research involving screening programs implemented by nephrology nurses is essential. Moreover, a formalized plan of nursing interventions that address depression should be investigated.

Implications for Practice

As previously mentioned, nephrology nurses must make an effort to achieve an expert level of practice as they encounter depression and non-adherence in their patients. Nurses must refrain from subjective responses regarding treatment schedule non-adherence. Specifically, nurses should attempt to determine potential underlying factors in non-adherence through the nurse/patient relationship. Schedule non-adherence must be viewed as potential maladaptive coping in the face of chronic illness, stress, and underlying depression. Research that involves nurse/patient relationships would provide greater insight into the impact that nephrology nurses may have with regard to patient adherence.

Once again, nursing interventions including close nurse/patient relationships, identification of depressive symptoms, screening, and referrals to appropriate mental health professionals are essential. These measures may improve patient adherence and promote adaptive coping in patients facing the chronic illness CKD. These interventions constitute the expert level of nephrology nursing practice.

Summary

This research addressed the issue of depression and non-adherence to outpatient HD treatment schedules. These problems are frequently present in this patient
population. Intuitively, it seems likely that depression would be a risk factor for non-adherence to the treatment schedule, however little research has been conducted to determine the nature of the relationship.

The research indicated that participants who missed 100 minutes or more treatment time due to non-adherence had significantly higher depression scores when screening was completed than participants who missed no time due to non-adherence. The emotional well-being of the most adherent participants was thus superior to that of less adherent participants.

Nephrology nurses must practice at an expert level to address depression and non-adherence to the treatment schedule in their patients on outpatient HD. Chronic Kidney Disease may lead to stress, depression, and maladaptive coping that is manifested in non-adherence. Close nurse/patient relationships, depression screening, and referrals have are important nephrology nursing interventions that may improve outcomes for these patients.
APPENDIX A

Study Title: Depression as a Risk Factor for Non-adherence to Outpatient Hemodialysis Treatment Schedules.

Investigator: Nancy Calton, R.N., MSNc, CDN

Nancy Calton is a Registered Nurse studying the relationship between depression and missed and shortened hemodialysis treatments in the hemodialysis clinic setting. Improved understanding of this healthcare issue may benefit your personally if you are suffering from depression. You may also benefit from improved nursing knowledge and a higher level of nursing care.

This study and its procedures have been approved by an institutional review board at California State University, Sacramento. Potential study benefits may include improved identification of depressive symptoms in hemodialysis clinic patients, fewer missed or shortened treatments, and improved nursing knowledge and nursing care. Potential disadvantages of participating in the study may include fatigue, time spent completing a questionnaire, and possible emotional distress related to discussion of depression. Information about contacting local counseling services for depression or suicidal feelings has been included with this consent document in the event that you feel that you need professional help with these issues. The procedures include: (1) responding to a questionnaire about depression and (2) completing a participant name data sheet. Participation in this study will take approximately 20 to 25 minutes of your time. Ms. Calton also requests your consent to review your medical records for information such as the number of missed or shortened treatments, age, gender, ethnicity, medical history, and treatment information. The information from your medical records will be used only for research purposes. You are free to ask any questions about the study or about being a participant, and you may call Ms. Calton at (916) 453-0803 (work) or (916) 296-0070 (cell) if you have further questions.
APPENDIX A

Participant Informed Consent

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Your participation in this study is voluntary; you are under no obligation to participate. You have the right to withdraw at any time and your care and your relationship with the health care team will not be affected. You will be assigned a participant number so that your questionnaire and medical record information will not be linked to your name. Your identity will not be revealed during the study or when the study is reported or published. All data will be collected by Ms. Calton, stored in a secure place, and not shared with any other person without your permission. The study findings will be disclosed in Ms. Calton’s master’s degree thesis, but nothing to indicate your identity will be included in the thesis or any other published research articles.

I have read this consent form and voluntarily consent to participate in the both the questionnaire and medical record review phases of this study.

----------------------------------
Participant’s Signature     Date
----------------------------------
Legal Representative     Date

I have explained this study to the above subject and to have sought his/her understanding for informed consent.

----------------------------------
Investigator’s Signature     Date
----------------------------------
Dear Sir or Madam:

Nancy Calton, RN, MSNc, CDN is doing a research study for her Master’s degree about depression and missed or shortened hemodialysis treatments. Your participation is greatly appreciated.

Please complete the enclosed questionnaire and informed consent and return them in the enclosed postage-paid envelope. Your participation is voluntary, however higher numbers of participants will make the study more meaningful. Please participate if at all possible.

The findings of the study will be disclosed in the Master’s thesis and may also appear in nursing and medical journals. The findings will also guide nursing care and hopefully improve your well-being as a dialysis patient.

If you have any questions, please discuss them with Nancy at the dialysis center, or you may call her at (916) 296-0070.

Sincerely,

Nancy Calton, RN, MSNc, CDN
APPENDIX C

COUNSELING RESOURCES FOR DEPRESSION

WEBSITES:

1. National Alliance on Mental Health, Sacramento

2. Suicide Prevention, Awareness, and Support

3. National Suicide Prevention Lifeline
   http://www.suicidepreventionlifeline.org/

TELEPHONE NUMBERS:

1. National Alliance on Mental Health, Sacramento
   (916) 874-9416

2. Suicide Prevention, Awareness, and Support
   (916) 732-3637

3. National Suicide Prevention Lifeline
   1-800-273-TALK (8255)


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