

1982

SOCIAL NETWORK CHARACTERISTICS,
SOCIAL SUPPORT, AND COMPLIANCE TO
A CHRONIC HEMODIALYSIS REGIMEN.

PETER L. BURGHER
University of Windsor

Follow this and additional works at: <http://scholar.uwindsor.ca/etd>

Recommended Citation

BURGHER, PETER L., "SOCIAL NETWORK CHARACTERISTICS, SOCIAL SUPPORT, AND COMPLIANCE TO A CHRONIC HEMODIALYSIS REGIMEN." (1982). *Electronic Theses and Dissertations*. Paper 3493.

This online database contains the full-text of PhD dissertations and Masters' theses of University of Windsor students from 1954 forward. These documents are made available for personal study and research purposes only, in accordance with the Canadian Copyright Act and the Creative Commons license—CC BY-NC-ND (Attribution, Non-Commercial, No Derivative Works). Under this license, works must always be attributed to the copyright holder (original author), cannot be used for any commercial purposes, and may not be altered. Any other use would require the permission of the copyright holder. Students may inquire about withdrawing their dissertation and/or thesis from this database. For additional inquiries, please contact the repository administrator via email (scholarship@uwindsor.ca) or by telephone at 519-253-3000ext. 3208.

CANADIAN THESES ON MICROFICHE

I.S.B.N.

THESES CANADIENNES SUR MICROFICHE



National Library of Canada
Collections Development Branch

Canadian Theses on
Microfiche Service

Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada
Direction du développement des collections

Service des thèses canadiennes
sur microfiche

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

SOCIAL NETWORK CHARACTERISTICS,
SOCIAL SUPPORT, AND COMPLIANCE TO A
CHRONIC HEMODIALYSIS REGIMEN



by.

Peter L. Burgher
B.A., Lehigh University, 1969
M.A., University of Windsor, 1976

A Dissertation
Submitted to the Faculty of Graduate Studies
through the Department of Psychology
in Partial Fulfillment of the
Requirements for the Degree
of Doctor of Philosophy at the
University of Windsor

Windsor, Ontario, Canada

1981

© Péter L. Burgher 1981

772287

ABSTRACT

Nonadherence to hemodialysis fluid restrictions is a particularly difficult and dangerous problem for chronic dialysis patients. Review of noncompliance studies suggests that enmeshment in a stable supportive family and peer network is predictive of improved compliance. The network model and mapping techniques, used to study how people adapt to different life stresses, provides a useful means to evaluate the relationship between support network characteristics and dialysis compliance.

Forty chronic hemodialysis patients were recruited from three metropolitan dialysis units in southeastern Michigan. Noncompliance was defined as 3-month mean interdialysis weight gains one standard deviation above the population mean. Twenty noncompliant patients were demographically matched pairwise with twenty compliant patients. Network predictor variables, determined through a structured interview, were: size, density, homogeneity, multiplexity, staff and family percentage, duration, frequency, proximity, reciprocity, dialysis awareness, influence, change, and level of desired interaction, value similarity, concern, trust, and assistance.

Results showed that compliant patients had larger, more spread out and long-standing networks, with fewer staff and more multiple-role relationships. Compliant patients appeared to also have more dense networks consisting of more family members. Information from all the variables was used to correctly classify 85 percent of noncompliant and 95 percent of compliant patients.

Factor analysis produced six factors: Change, Family Enmeshment,

Size, Medical Status Awareness, Support, and Reachability. Size and Family Enmeshment demonstrated significant associations with compliance, accounting for 30 percent of individual compliance variance.

The findings of more dense, family oriented networks for compliant patients is interpreted as partial confirmation of the importance of emotional support, empathy and stable sense of self identity for compliance. The negative findings for direct measures of relationship support, using the five scales - assistance, concern, trust, value similarity and desired interaction - are interpreted as an indication of response bias, present in the hemodialysis population, towards denial of any problems in their personal lives. The outcome of this study is taken as (1) further evidence of the utility of the network model and network mapping techniques, and (2) as additional support for the hypothesized relationship between compliance and emotional support. Implications for clinical intervention with noncompliant patients are drawn, along with suggestions for future research.

ACKNOWLEDGEMENTS

I am most grateful to the dialysis patients who participated in this research. They have given unselfishly of their precious time and energy to make this study possible. I greatly admire their courage and perseverance. I have been enriched through my experience with them.

I wish to thank Dr. Marvin Kaplan, my mentor and friend, for his ongoing support and guidance as my dissertation chairman. I also greatly appreciate the hard work and encouragement of my other committee members, Dr. Frank Schneider and Dr. Barry Taub. I am fortunate to have been allowed to work with such capable psychologists.

Dr. Marc Filisuk, my outside reader, gave freely of his valuable time and provided important and helpful feedback to myself and my committee. I appreciate his help very much.

I would also like to express my appreciation to Dr. Nathan Levin for his permission to carry out this study at Henry Ford Hospital, and to his dialysis staff at Fairlane and Troy Centers for their important assistance. Dialysis nursing staff are special people.

Dr. Meyer Starr and Peter O'Neill provided critical statistical assistance when called upon and I thank them for this. Dr. Starr needs more recognition for his key role in department research.

I am especially grateful to Irene Arseneau, for her diligence and patience as my typist. Her willingness to help went far beyond the expected.

Finally, I wish to thank my family and many dear friends for their encouragement and emotional support. I have been blessed with a

social support network as fine as anyone would hope for. I hope I can return some small part of what I have received.

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER	
I - INTRODUCTION	1
Hemodialysis: General Background and Relevance of	
Compliance Measures	3
Determinants of Nonadherence	6
Sociodemographic Characteristics	7
Patient Personality	9
Health Beliefs	11
Patient-Provider Relationships	12
The Patient's Social Situation	15
Social Networks and Network Analysis	18
Network Concepts and Variables	19
Use of the Social Support Concept	24
Use of the Network Paradigm	26
Summary	32
Hypotheses	34
II METHODOLOGY	38
Choice of Compliance Measure	38
Subjects	39
Procedure	44
Subject Recruitment	44
Data Collection Procedure	45
Predictor Variables	48
III RESULTS	54
Comparison of Network Characteristics	54
Correlations with Individual Compliance	58
A Test of the Overall Model	60

TABLE OF CONTENTS CONTINUED

CHAPTER	Page
III	Correlations Between Network Variables..... 61
	Results of Regression Analyses 65
	Results of Factor Analysis 69
IV	DISCUSSION 76
	Network Differences for Compliant and Noncompliant Subjects 77
	A Best Model for Predicting Compliance? 83
	Interpretation of Negative Results 84
	Limitations of the Study 86
	Conclusions and Implications 88
APPENDIX	
A	Values for Demographic and Medical History Variables by Pair 91
B	Patient Consent Form 95
C	Operational Definitions of Criteria for Social Network Membership 97
D	Network Relationship Questionnaire 100
E	Factor Loadings of the 13 Social Relationship Items Used in the Brim (1974) study 104
F	Pearson Correlation Coefficients for Network Variables with each Other 107
G	Best n-Predictor Models for Group 111
H	Pearson Correlation Coefficients for Demographic Variables with Network Variables 113
	REFERENCES 115
	VITA AUCTORIS 133

LIST OF TABLES

Table		Page
1	The Functions Served by Social Networks, Support Systems or Both	25
2	A Comparison of Patient Characteristics Between Groups	43
3	A Comparison of Network Characteristics Between Groups	54
4	Pearson Coefficients for Network Variables with 3-Month Average Interdialysis Fluid Weight Gains	59
5	Pearson Correlation Coefficients for Network Variables with Each Other	
6	Best 1-, 2-, 3-, 4-, 5-, and 6-Variable Models for Prediction of 3-Month Individual Average Compliance	67
7	Eigenvalues and Variance Accounted for by Factors I-VI	70
8	Rotated Factor Pattern and Pearson Product- Moment Correlations Between Factors and Compliance	71
9	Results of General Linear Regression Procedure for 2- and 6-Factor Models	74

LIST OF FIGURES

Figure

Page

1	Distribution of 3-Month Interdialysis Weight Gain Averages	41
---	---	----

CHAPTER I
INTRODUCTION

The purpose of this study is the examination of the use of a social network model to explore the relationship between social support and compliance to a chronic hemodialysis regimen. The basic goal of this study is to inquire how the structure and functioning of a dialysis patient's personal support network affect that patient's ability to cope with the very considerable, on-going stress of this treatment and remain compliant to its exacting regimen. This research also seeks to evaluate the usefulness of a social network model in attempting to explore the relationship between social support and compliance.

The rationale for this study begins with the observation that non-adherence to medical regimens is a poorly understood, difficult problem, whose consequences are costly in that most precious of our resources, a healthy human life (see Haynes, Taylor, and Sackett, 1977). The critical importance of compliance is especially evident in the treatment of chronic hemodialysis patients. The dialysis regimen is particularly restricting, requiring severe fluid and dietary restrictions, and virtually every dialysis patient struggles, at one time or another, with remaining compliant. Estimates of non-compliance in the dialysis population range from 13 percent (Borkman, 1976) to 45 percent (DeNour and Czaczkes, 1972). A study by Abram et al. (1971) estimated that noncompliance-related deaths ran

as high as 61 percent in a survey of 201 hemodialysis facilities. Degree of compliance is undoubtedly a contributing factor in the longevity of virtually every patient on hemodialysis.

The magnitude of noncompliance to all types of medical regimens and the enormous costs in terms of human life and death have led researchers to explore a variety of ways to cope with this issue. One way has been to attempt to differentiate compliers from non-compliers on the basis of personality factors. Unfortunately, this has not proved successful. A recent major review of 537 compliance studies fails to generate anything approaching a consistent non-compliant personality type (Haynes, 1979). In general, individual characteristics, as measured in these studies, are shown to be little related to compliance behaviour. On the other hand, these studies present evidence that suggests a relationship between measures of compliance and "degree of enmeshment" in a stable, supportive "network" of friends, family and peers.

Although not based on studies of dialysis patients, these findings are consistent with clinical reports of mental health professionals working with dialysis patients and their families. Unfortunately these studies of social support and compliance have been subject to significant methodological weaknesses. Most often "support" has been defined and assessed through the use of one or several questionnaire items. No study has made the patient's social support systems the principle target of investigation or has examined the nature of support systems.

The social network model and network mapping methodology, developed by sociologists and anthropologists over the past 30 years,

provide an appropriate framework for beginning to evaluate the relationship between social support system characteristics and a patient's compliance behaviour. This network model has recently been utilized to study how persons cope with a variety of stressful life events, such as bereavement, (Walker, MacBride, Vachon, & Vachon, 1977), unemployment (Gore, 1978), mental hospital admission (Horwitz, 1977), and a wife's response to her husband's post-infarct career (Finlayson, 1976).

The present research project therefore offers an opportunity to examine specifically the social support network characteristics of a chronic hemodialysis population and to explore in what way, if any, these characteristics are related to compliance to the dialysis regimen. Mental health professionals recently have developed network intervention techniques (Speck & Attneave, 1973). This study may, therefore, also lead to increased insight into a means for intervening in patients' support system in such a way as to increase optimal compliance.

Hemodialysis: General Background and Relevance of Compliance

Measures

The kidneys serve several critical functions including control of the volume, composition, and pressure of body fluids; excretion of waste products of protein metabolism - urea, uric acid, creatinine, and organic acids; and production of two important hormones which regulate blood pressure and red blood cell production (Berkow, 1977). Chronic renal failure results from several different conditions including: hereditary kidney disease (polycystic kidney disease);

bacterial invasion of the kidney parenchyma; as a complication of long-standing diabetes mellitus (usually having its onset in childhood or adolescence); as a complication of severe high blood pressure; and from an obstruction of the lower urinary tract (Gutch & Stoner, 1975). Irreversible damage to the kidneys (end stage renal disease), in which 90% or more of normal renal function is lost, requires an artificial means of carrying out the above listed functions. Therapeutic dialysis by diffusion across a semipermeable membrane, the patients own peritoneum in the case of peritoneal dialysis, and an artificial kidney membrane in the case of hemodialysis, is essential to forestall the onset of uremic syndrome, which results from the build up of toxic wastes. Uremic syndrome involves many major body systems and is characterized by a wide range of symptoms: hypertension, chronic heart failure, and pericarditis (cardiovascular); anorexia, nausea, G.I. bleeding and peptic ulcers (gastrointestinal); fatigue, sleep disturbance, and headaches (neurological); and depression, anxiety and psychosis (psychological). Hemotological, endocrine and metabolic changes are often present as well (Schoenfeld & Humphreys, 1976).

Hemodialysis therapy, or its equivalent, peritoneal dialysis, can prevent or eliminate the symptoms of uremic syndrome and prolong life of renal patients for many years (in some people, ten years and more). Hemodialysis accomplishes this by filtering of waste products in the blood through the semipermeable membranes found in the artificial kidney. Dialysis treatments are not, however, sufficient to prevent or eliminate the symptoms of uremia. Dialysis patients are required to follow a strict medical regimen which includes significant dietary restrictions, limitations on interdialysis fluid

intake, and adherence to multiple, often confusing drug schedules. Any significant noncompliance to these restrictions over a period of time will lead to increased symptoms and can cause the patient's premature death.

Despite the critical importance of compliance to these restrictions, a number of studies over the past ten years have demonstrated that large numbers of dialysis patients fail to comply with their regimen in various degrees. DeNour and Czaczkes (1972), using a composite dietary compliance measure which included assessments of serum potassium and blood urea nitrogen (BUN) levels, reported a 45 percent abuse rate for 43 Israeli dialysis patients. Another study utilizing staff ratings of patient compliance on a three point scale found only 13 percent of patients to be "poor" compliers to salt and protein restrictions (Borkman, 1976). Blackburn's (1977) findings fall between these extremes. Based on a sample of 53 patients, she found 30 percent noncompliance to salt restrictions, but 54 percent noncompliance to fluid restrictions. Finally, Hartman and Becker (1978) more optimistically reported a 26% noncompliance rate for salt intake and a 22% rate for fluids abuse.

These differing rates of noncompliance are in part the result of different definitions and means of measurement, use of staff estimates versus harder empirical data, different definitions of compliance and use of different measurement schedules in different settings.

In any case, it is clear that a significant proportion of the

dialysis population fail to adhere to their regimen. To some extent, the emphasis on a compliant-noncompliant dichotomy is misleading. For every patient it is a matter of choosing the degree of compliance they will accept weighed against such important considerations as (1) its effect on reducing the quality of their life, (2) their need for approval from dialysis staff and others who highly value compliant behaviour, and (3) the extreme difficulty in constantly having to monitor fluid and dietary intake. No fact concerning dialysis is better documented than the great difficulty virtually every dialysis patient experiences in attempting to remain reasonably compliant (DeNour and Czaczkes, 1972, 1974, 1978; Wizenbeck and Muritz, 1970; Goldstein and Reznikoff, 1971; Blackburn, 1977; Snyder, 1977; Abram et al. 1971; Borkman, 1976; Hartman and Becker, 1978). Finally, the critical importance of compliance for survival is abundantly clear in the results of a study of Czaczkes and DeNour (1976). They report that at the end of a five year study, only 21 per cent of the survivors could be considered abusers of their regimen, while 58 per cent of those who had died had been rated as noncompliers ($\chi^2 = 10.91$; $p \leq .005$). The following section will show that the parameters of the problem are unfortunately better understood than are the causes.

Determinants of Nonadherence

Research on nonadherence has been largely descriptive and atheoretical. The medical model of research on compliance has relied too heavily on a "shot gun" method of selecting items for study, rather than drawing its hypothesis from some conceptual framework. In this section, findings from the general medical literature will be reported and integrated with a description of the findings of those

studies which have specifically examined dialysis compliance.

Haynes (1979) has reviewed the determinants of compliance to all variety of medical regimens, evaluating in the process 537 separate studies. Although he reviewed a wide range of factors, demographic characteristics of patients, features of the disease, regimen and therapeutic source, aspects of patient-physician interaction, and socio-behavioural characteristics of patients, he concludes that only a few factors appear to be consistently linked with patient noncompliance. These are: psychiatric diagnosis of schizophrenia or personality disorder; the complexity, duration, and amount of change required by the regimen itself; inadequate supervision by professionals; patient self-reported level of satisfaction with their treatment, "inappropriate" health beliefs; nonadherence to another aspect of the regimen and family instability. Significantly, the range of sociodemographic variables, measures of multiple personality traits, knowledge of disease and non-compliance effects, and health status have not been shown to have any consistent relationships to nonadherence. These findings are supported by those of other reviewers (Becker & Maiman, 1975; Kasl, 1975). It will be helpful to consider further some specific findings in these several categories, first looking at the general compliance reports and then the reports specific to hemodialysis compliance.

Sociodemographic characteristics. In the general compliance literature, age is typically uncorrelated with compliance within the patient role, although the very old are somewhat less likely to engage in preventative health behaviours, presumably because of problems of isolation, forgetfulness, or self neglect. Davis (1968)

and Hulka et al. (1976) found no relationship between age and medication compliance. In the dialysis literature the results are mixed. One study found that dialysis staff rated younger patients as more compliant (Meldrum et al., 1968), while Hartman and Becker (1978) found older patients more compliant to medication and dietary restrictions. Blackburn (1977) found no association between age and compliance.

In the general compliance literature, it seems well established that men and women do not differ systematically in following medical advice after an illness has been diagnosed. Women were found to be more likely to engage in preventative health measures in one study (Rosenstock, 1974). In the dialysis reports, there are again contradictory findings, one study finding women more compliant to medication and dietary advice (Blackburn, 1977), the other finding males to be better compliers (Hartman and Becker, 1978).

Education and socioeconomic status have not been consistently found to be related to adherence in the general medical literature. Where a relationship has been found, it has shown that more educated, higher social class subjects tend to be more compliant, (Caldwell et al., 1970). The dialysis reports find no consistent relationship here (Blackburn, 1977; Hartman & Becker, 1978).

Marital status and employment status information again, provide little prediction of compliance in the general medical population. However, for dialysis patients, being married appears to enhance the likelihood of their compliance (Meldrum et al., 1968, Friedman, Goodwin and Chaudhry, 1970; Hartman and Becker, 1978). Blackburn (1977) found no difference between married and unmarried patients.

Patient Personality. As already noted, the general review of medical compliance studies fails to generate anything approaching a noncompliant personality type (Blackwell, 1973). Stability of personality, more than any particular personality characteristic, seems to be relevant (Haynes, Taylor, and Sackett, 1979). At least some reports of the dialysis population, however, claim to have identified important personality dimensions related to adherence. DeNour and Czaczkes (1972) observed 43 chronic dialysis patients in a longitudinal study of the influence of low frustration tolerance, acting out tendencies, denial of the sick role, excessive secondary gain from the sick role, and suicidal-depressive tendencies on non-compliance. Data were gathered from systematic psychiatric evaluations and ongoing psychotherapy records in a few cases. Low frustration tolerance and excessive gains from the sick role were found to significantly discriminate between abusers and non-abusers. The authors unfortunately present no clear information about how these characteristics were operationally defined and measured and one gets the impression that their discovered relationship between frustration tolerance and compliance is little more than tautological. The hypothesized relationships between noncompliance and acting out tendencies, denial, suicidal behaviour, and illogical emotional beliefs were not confirmed.

A number of other researchers have reported general impressions of the "well adjusted" dialysis patient. He is described as having good "object relations" and good "sublimations" before becoming ill (Levy and Wynbrandt, 1975), being more mature, stable, flexible and having a deeper capacity for relating with others and forming strong relationships with a significant other (Beard, 1969), and as having a

deep sense of confidence, basic trust, and hope stemming from a particularly gratifying infantile mutuality with his mother in his earliest years (Viederman, 1974). Foster et al. (1973) found that maladjusted dialysis patients who died significantly more often had lost their parents. Several other studies have focused on the patient's emotional reaction to his disease as a predictor of adjustment. Less denial and a willingness to accept the full significance of the disease process, its treatment and inherent restrictions, and an ability to discuss anxieties and problems, have all been described as characteristics of the better adjusted patient (Menziés and Stewart, 1968; Sand et al., 1966; Meldrum et al., 1968; Cummings, 1970).

Although other studies could be cited these are representative. It should be pointed out that the dependent measure in these studies has been "adjustment" and not compliance per se, and that the methodologies used have more often been case reports rather than empirical studies using systematic reliable measures with a large sample. They are, in short, more speculative than confirmatory.

It is unclear how intelligence affects compliance, despite the fact that dialysis staff and physicians often incorrectly assess a patient's compliance level on the basis of his perceived intelligence (Borkman, 1976). Two studies have found a small positive relationship (Winokur et al., 1973). Perhaps the largest study to date found that intelligence apparently is only indirectly tied to compliance through its influence on the patient's comprehension of their treatment regimen (Borkman, 1979).

In summary, the research on personality correlates of non-compliance is disappointing. Most of this work has been carried out

on subject populations other than dialysis patients and fails to generate a compliant "type". The dialysis compliance literature is much smaller, but also fails to develop a clear picture of the non-compliant personality. The dialysis "adjustment literature", despite its methodological weaknesses, is at least suggestive. It seems to suggest that the salient personality dimensions related to adjustment (and perhaps compliance by extension) are those which allow the patient to build, maintain, and utilize significant relationships with others. This would seem to support an interpersonal model for understanding compliance as opposed to a purely intrapersonal model.

Health Beliefs: Some of the most consistent positive findings relative to compliance behaviour have been generated by "The Health Beliefs Model". This model was developed in the 1950s and sought to explain how specific decisions to engage in preventative health behaviours were related to value of that behaviour for coping with a perceived threat (Rosenstock, 1979). More recently the model has been extended to sick role behaviours after an illness has been diagnosed. The cognitive elements of the model are: 1) the patients' beliefs about the nature of the threat they are facing, their degree of vulnerability subjectively assessed, 2) their beliefs about the efficacy of engaging in the preventative or compliant behaviour in terms of their ability to forestall the perceived threat, and 3) their beliefs about the possible barriers or costs to them associated with taking an action (e.g., cost, duration, complexity, side-effects, accessibility of regimen, and need for new patterns of behaviour).

This value-expectancy model has been shown to be useful in

predicting a patient's compliance to a variety of medical regimens and treatments (Becker, 1976; Becker and Maiman, 1975; Becker, et al., Drachman and Kirscht, 1972; Kirscht and Rosenstock, 1977, Cummings in press). Very recently, this model has been applied to the study specifically of chronic hemodialysis patients. Cummings (1980) evaluated dialysis patients using empirical measures of compliance , actual interdialysis weight gains and serum potassium and phosphorus levels. Despite the significant findings with this model in studies of other populations, the health belief model variables together accounted for only a small degree of the variance in dialysis patients compliance behaviour. Kirscht and Rosenstock (1979) point out that this model is perhaps least effective in dealing with strongly habitual behaviour (as in the case in the dialysis regimen, which requires changes in fluid consumption and eating patterns) and that the model fails to take adequate account of the variety of social-situational factors which could facilitate or inhibit a particular course of action. This may partly explain Cumming's results.

Patient-Provider Relationship: Increasingly attention has turned to the social context in which illnesses are lived and compliance required (Stimson, 1974; DiMatteo, 1979; Bloom and Wilson, 1972; Hayes - Bautista, 1976; Stone, 1979). A more interactive view of patients is entailed in which patients have expectations of the medical care providers, evaluate their actions and in general take responsibility for their treatment decisions. Nonadherence, in this view, is seen as residing in the interactional dynamics between patient and provider rather than in any particular type of person. Anyone can become a defaulter at some time.

Research to date suggests that at least three dimensions of the patient-practitioner relationship are closely related to patient adherence: 1) the amount of control a patient retains in the relationship, 2) the degree of congruence of expectations on each person's part, and 3) the degree of emotional support provided the patient.

With respect to control, several researchers have noted that noncompliance appears to be a means by which patients attempt to regain some degree of control over their illness, and to the extent that the patient is allowed by his or her physician a reasonable degree of control in treatment decisions, he is likely to be more compliant (Hayes-Bautista, 1976; Barofsky, 1978; Taylor, 1979; Brehm, 1966). One study, for example, demonstrated that an intervention to increase patients' question asking in their interaction with a physician led to increased compliance, presumably by giving the patient a greater sense of control in what is more often experienced as a very powerless position (Roter, 1977).

Referrant power, based on mutual respect, trust, and liking in an ongoing relationship, is generally conceded to be more effective in gaining patient compliance than coercive, expert, reward, or legitimate power (Rodin and Janis, 1979). Davis (1968) analyzed taped interaction between physicians and their patients and found that when the doctor emphasized information collection, ignored the patient's need for feedback, and in general took a "one-up" position to this patient, the patient was subsequently less compliant.

Another group of studies have focused on the physician's ability to provide emotional support for his patients. A physician's lack

of sensitivity to the patient's expectations regarding their interaction, and failure to meet these expectations, has been linked to nonadherence in several studies (Kasl, 1975). Caring, concern, and warmth, as perceived by the patient, have invariably led to higher levels of compliance (Francis, Korsch, and Morris, 1969; Freeman et al., 1971). Emotional support not only bridges over a patient's uncertainty regarding the content and outcome of treatment, but also is an essential element in a patient's evaluation of and satisfaction with his treatment (Ben-Sira, 1980). Satisfaction with treatment, in turn, has been shown to highly correlate with compliance to the treatment regimen (Becker, Drachman and Kirscht, 1972; Haynes, Taylor, and Sackett, 1979). Despite these promising findings which have recently led medical schools to place increased emphasis on teaching interpersonal skills, concepts like support, empathy, "good communication", and "satisfaction with treatment" are difficult to operationalize and have been used to mean different things in different studies.

While little research has examined the patient-health-care-provider relationships on a dialysis unit, it is widely conceded that the nature and quality of the relationships in this setting effect the patient's willingness to remain compliant to his regimen (Blackburn, 1977; DeNour and Czaczkes, 1968, 1972; Cummings, 1970, Wertzel et al., 1977). Dialysis patients have an intense emotional involvement with the staff that provide their life-dependent treatment and because of this, the amount of support and useful feedback staff provide with respect to compliant behaviour can be expected to have a significant influence on continued compliance. On the other side, dialysis staff have a heavy emotional involvement in their patients and are

powerfully influenced by patient noncompliance which is perceived, at least by some, as a direct rejection of their caring (DeNour and Czaczkes, 1978). There is some evidence that dialysis staff misidentify noncompliant patients by assuming that more intelligent patients are more compliant (Brokman, 1976). Evidence also suggests that patient assignment to a noncompliant-bad-patient role may in part occur as a self fulfilling prophecy (Foster and McKegney, 1977). Yet another observer of the dialysis environment has drawn the analogy of the "double bind", with patients caught between two conflicting communications from the staff: on the one hand to be independent and autonomous, and on the other, passive and dependent (Alexander, 1976).

The Patient's Social Situation: Influence of family and friends, family stability and family size have been among the most consistent factors found related to medical compliance (Haynes, Taylor, and Sackett, 1979). One major avenue of influence is through role expectations which are shaped by significant others. Davis (1968) studied farmers with heart disease and found that those men caught up in a strong work orientation were much less likely to adhere to their physicians' recommendations regarding work curtailment. Green (1970), in a similar vein, explains the tendency of preventative health behaviour and attitudes to cluster in families as due to commonly shared normative expectations. In a study specifically of dialysis patients, O'Brien (1976) examined the relationship between compliance and a patient's perception of the expectations of family and significant others. She found that the perceived expectations of family members and close friends were most influential in affecting a patient's social functioning, quality of interactions, and degree of felt

alienation: Expectations of doctors and medical personnel, on the other hand, were significantly correlated with the patient's self-reported degree of compliance to their regimen. Regretably no objective compliance measures were obtained and it is well established that patient's reports overestimate their own compliance (Cummings, 1980). In addition she noted that the influence of medical personnel's expectations was particularly strong for the lowest socioeconomic strata.

Sociological research has provided further evidence that characteristics of a patient's social group, particularly subcultural beliefs and practices, socioeconomic status, degree of ethnic exclusivity, friendship network density and family organization along traditional and authoritarian lines, affect a patient's medical orientation, how much he knows about his illness, his level of skepticism about medical treatment, and his level of dependency in the patient role (Suchman, 1965; Geertsen et al.; 1975).

Recent interest in the social situational factors influencing health behaviour and compliance has focused with growing interest on the concept of social support. Caplan and others (1976), in a study of hypertensive patients, observed that compliance was improved when patients attended supportive group session. Family influence has also been noted by several investigators as a factor in compliance and preventative health behaviours (Donabedian and Rosenfeld, 1964; Haggerty and Roghmann, 1977). In the dialysis literature as well, the influence of family and friends on patient adjustment and compliance has been noted (Freyberger, 1973; Malinquist, 1972).

Hartman and Becker (1978) reported that patients with

fewer family problems and more assistance from their spouses complied better with dietary and medication regimens. Quality of family communication, assessed in terms of explicitness of statements and degree of personal responsibility assumed in making the statement, has also been found to be positively correlated with compliance behavior (Pentecost et al., 1976). The results of a recent doctoral dissertation completed by Roger Sherwood (reported in Yallen, 1980) found that noncompliance was associated not only with "disengaged", "underinvolved" families, but also with overinvolved, "smothering" families. Sherwood is also reported to have found that patients capable of reaching out to others during times of crisis were more compliant than those who could not or did not.

In summary, the review of studies of determinants of noncompliance in both the general medical population and the dialysis population suggests that further study of sociodemographic and personality factors is not very promising. Further study of the health beliefs model, while warranted, should be done in conjunction with investigation of situational factors which moderate the influence of these health beliefs. A more promising direction for further research would appear to be the investigation of the role of social support relationships which exist for patients in their families, their friendship network, and the medical staff. As noted, influence of family and friends have been among the most consistent factors related to medical compliance. No study, however, has yet systematically investigated the nature of a patient's entire social support network, and how its overall characteristics and the specific quality of its various links effect a patient's compliance behaviour. A number of

questions remain to be answered: Is compliance related to size and/or density of a patient's interpersonal network? Or, are other characteristics of these social ties, such as degree of intimacy, duration, symmetry, multiplexity, functional content, more important than morphological characteristics of the system as a whole? What is the nature of social support, who actually meets what needs for whom and with what effect on the willingness of a patient to adhere to a stringent medical regimen? The social network model and its evolving measurement techniques allow an opportunity to begin to answer these questions.

Social Networks and Network Analysis

The concepts of social networks and social support systems have recently received much attention from a variety of researchers and practitioners and would seem to offer an excellent vehicle for exploring the relationship between a dialysis patient's milieu characteristics and his or her compliance behaviour. While the notion of a "social network" has had a long history of use as a metaphor representing a complex set of inter-relationships, its use as a hard research tool to investigate a specific set of factors among a defined population is quite recent (Mitchell, 1969). The social network model has been used to investigate a variety of sociological and anthropological phenomenon: the social behaviour of a Norwegian island parish (Barnes, 1954), allocation of marital roles (Bott, 1957), the process of building support for a political campaign (Mayer, 1966), diffusion of new medical information to physicians (Coleman et al., 1957), and utilization of health services (McKinley, 1972, 1973; Salloway and Dillon, 1973; Langlie, 1977). Excellent reviews

and collections of this sociological and anthropological work are now available (Barnes, 1972; Whitten and Wolfe, 1974; Mitchell, 1974; Boussevain and Mitchell, 1973).

Psychologists and sociologists have become increasingly interested in the role social support plays in protecting an individual from the effects of significant life events and the stress they often engender (Dohrenwend and Dohrenwend, 1974; Dean and Lin, 1977, Andrews et al., 1978; LaRocco, House, and French, 1980; Cobb, 1976; Cassel, 1976). A number of investigators have begun to study the structure and functioning of individual personal support systems and how these systems effect a person's ability to adaptively cope with a variety of stressful life situations, e.g., unemployment (Gore, 1978); psychiatric illness and hospitalization (Hammer, 1963; Mueller, 1980); bereavement (Walker, McBride, and Vachon, 1977); and recovery from a coronary accident (Finlayson, 1976). In addition, network analyses have also been used to examine entry into the psychiatric system (Horwitz, 1977), utilization of health care services (Solloway and Dillon, 1973; McKinley, 1972, 1973) and self-report level of happiness (Brim, 1974).

Network Concepts and Variables. There is general agreement that the notion of social networks is simply a technique of data collection and analysis and does not of itself constitute a "theory" in the sense of having its own basic assumptions and a derived set of propositions capable of being tested (Mitchell, 1974; Kapferer, 1973; Barnes, 1972). Nevertheless, these same investigators and others agree that the work of social exchange theorists, Blau (1964), Homans (1961), and Thibaut and Kelley (1959), provides the theoretical underpinnings for network analysis. The basic view is one of society structured

by its transactions rather than by its institutions, whose normal bonds are not to be assumed by family, socioeconomic position, or place of employment setting, but of a "relevant series of linkages existing between individuals which may form a basis for the mobilization of people for specific purposes under specific conditions" (Whitten and Wolfe, 1974, p. 720). "The basic approach here is to examine all the social links - loose or strong, dense or diverse, frequently or rarely used - that emanate to and from an individual" (Pilisuk and Froland, 1978, p. 776).

Two broad modes of use of social network methodology can be identified in the literature. The first, system-centered analysis, makes its focus all the linkages between all the individuals who are members of a particular population (e.g., a community or organization). This approach is feasible only with relatively small well bounded populations. The other approach, the personal network method, addresses itself to all the linkages involving a single focal individual (Mitchell, 1969). It is this latter method which appears useful in examining the relationship between a patient's compliance behaviour and his social network.

There are currently several useful introductions to the range of concepts employed by network analysts (Mitchell, 1969; Boissevain and Mitchell, 1973; Mitchell and Trickett, 1980; Pilisuk and Froland, 1978). In general there appear to be two levels of analytic concepts: those examining the links within a network and those concerned with attributes of the whole network. Of the whole network dimensions which have been examined those that would seem to hold particular relevance to health behaviour and social support concerns are:

(a) size or range - the number of individuals with whom the focal

person has direct contact (a discussion of the different criteria used to define network membership will be found in the methodology chapter)

(b) network density - the extent to which members of an individual's social network contact each other independently of the focal person (Mitchell, 1969). (It is computed by dividing the actual number of ties between network members by the total number of possible ties (some researchers feel that assessment of density within defined clusters is more important than average density across the whole network))

(c) number of clusters - the extent to which distinct cliques or clusters or dense links exist within a network;

(d) homogeneity - the extent to which network members share common psychosocial or cultural attributes (e.g., socioeconomic status, ethnicity, neighborhood membership, education) and

(e) number or percentage of kinship members/linkages - these variables are useful in assessing particular contribution of primary family relationships to the behaviour under study. Other specific subgroups, secondary kin, friends, work acquaintances, might also be assessed for their contribution. These variables help to establish the normative context of relationships, a dimension likely to influence health care beliefs, compliance, and preventative health behaviour.

Characteristics of component linkages include: (a) intensity - the strength of the tie. It has been measured in terms of the number of reciprocal functions or services which make up the tie (Shulman, 1976) and an individual's subjective rating of the strength of feelings or thoughts toward each member (Ilmas, 1976 - cited in Mitchell and Trickett, 1980)

(b) duration - the length of time the focal person has known this person. (This measure has also been used to

assess the degree to which the focal person perceives the relationship to be changing (Henderson et al., 1978)) (c) multidimensionality/multiplexity - both terms refer to the number of different functions the relationship serves. Proportion or number of multiplex relationships could constitute another total network characteristic. A difficult, as yet unresolved methodological issue is the way in which to categorize and code relationships: according to content function, role relations, distinct activities, modes of interaction, or type of support; (d) directedness/reciprocity - the degree to which affective and instrumental aid is both given and received by the focal person. This has usually been assessed by asking the focal person to make a subjective judgment (Tolsdorf, 1976). Again researchers differ in types of functions they see as salient; (e) dispersion - geographical proximity or ease of contact with each particular network member; (f) frequency - frequency of contact, whether in person, by phone, or by mail; and (g) content - clearly a difficult concept to operationalize, content has probably most often been taken to mean the principle goods or services exchanged in the relationship (eg., economic assistance, friendship support, recreational partnership, medical assistance, or kinship obligation). Not infrequently researchers purposely restrict the range of contents under investigation (eg., types of social support).¹

While each of these features provides unique information about social networks which may very well have important implications for health behaviours including compliance to medical regimens, it is

¹A discussion of types of support investigated by network researchers will be found in the following pages.

important to keep in mind that these variables are not unrelated. Frequency and duration of contact between members of a network are related to the degree of intimacy shared between them. Network density will affect frequency of contact; dispersion has been shown to be related to social class (Pilisuk & Froland, 1978). Social network dimensions have been seen to shift across the life cycle (Stueve & Gerson, 1977) and to be influenced by the broader social structure (Craven and Wellman, 1973) as well as cultural determinants (Mitchell, 1969).

While the very concept of social networks implies interactive effects, a few investigators have examined influences on social network factors, considered in this case the dependent measures (Kelley, 1977). Mitchell (1979) reports some preliminary findings that the psychosocial climate of a patient's family, degree of emphasis on autonomy, and the existence of viable social networks for other family members, seem to influence the nature and quality of the patient's own social network relationships outside the family. Another study implicating physical space factors found that friendship patterns and reported satisfaction with social participation differed for university students as a function of whether they lived on lower or higher floors of a high rise dormitory, elevation being related to ease of access to common space (Holohan et al., 1978). Other than socioeconomic characteristics of community, other community parameters influencing personal network development remain unexplored.

Individual variables related to social networks also remain largely unexamined although much speculated about. A few preliminary studies have produced evidence that coping style, particularly orientation

toward usage of one's social network , is important to understanding a person's ability to use social resources (Pearlin and Schooler, 1978; Tolsdorf, 1976). Several investigators have criticized the lack of attention to social competence effects in social network studies, pointing out that both network characteristics and dysfunctional behaviour may be independently the result of a deficiency in social skills (Henderson et al., 1978). Only a single study to date has attempted to assess how individual and environmental variables interact to effect the nature and adaptiveness of social networks for different individuals. Holohan and Wilcox (1978) found that friendship formation patterns in university residents differed as a function of both dormitory types as well as social competence.

Use of the Social Support Concept. While social networks have been studied in terms of their ability to provide some form of support, it is generally recognized that "support" encompasses a number of different functions. Recently there has been some attempt to specify more precisely the types of support associated with social networks. Table 1, compiled by Mitchell and Trickett (1980), shows how a number of researchers have broken down the concept of social support into components. As the authors themselves note, there is a great deal of similarity across theorists. Many of the subcategories can be grouped under one of these four functions: (a) emotional support; (b) task-oriented assistance; (c) communication of expectations, norms, values or a shared world view; and (d) access to new and diverse information and social contacts. Recognition that social networks potentially provide a number of different kinds of support is important in that a few early studies have begun to show that a particular

TABLE 1

The Functions Served by Social Networks, Support Systems, or Both *

	Caplan (1974)	Tolsdorf (1976)	Walker et al. (1977)	Weiss (1974)
Brim (1974)				
Concern	Emotional support	Support	Emotional support	Attachment
Assistance	Task-oriented	Advice	Material aid and services	Exchange of services
Value similarity	Communication of evaluation and expectation	Feedback	Maintenance of a social identity	Guidance
Desired interaction	Sense of belonging			Social integration
Trust				Sense of alliance
				Reassurance of worth
			Diverse information	
			Access to new social contacts	Opportunity to provide nurturance

*From Mitchell and Trickett (1980)

7

network structure (e.g., small, homogeneous, dense) which may provide one kind of support (emotional) is less effective in providing another kind of support (access to new and diverse information) (Granovetter, 1973). Thus it becomes important in assessing the effectiveness of any given set of network characteristics, to know which of the above needs is most critical to overcoming the problem faced by an individual. Unfortunately, in a given situation, as, for example, the case of a dialysis patient's daily struggle to remain compliant to his regimen, it is not always easy to know which category of support, and hence which group of network characteristics, is most helpful.

Use of the Network Paradigm. This problem, notwithstanding, several researchers have begun the process of examining these relationships, and there are at least some preliminary findings on which to build. Although they are not studies of social networks as such, there are numerous epidemiological studies which implicate social support network factors in adjustment to a variety of life stress. As Cassel (1976) notes: "a remarkable set of circumstances characterizes people who develop tuberculosis, schizophrenia, alcoholism, or become victims of multiple accidents or suicide. Common to all these categories is a marginal status in society" (p. 110). He goes on to cite a wide range of studies to indicate that the same apparent stresses do not lead to disabling pathologies under conditions where the individual finds continuous nurturant support. Several investigators have recently reviewed findings concerning the stress-buffering role of social support in a variety of stressful situations: pregnancy, hospitalization, recovery from illness, employment termination, bereavement, aging and retirement, and threat of death

(Cobb, 1976; Dean and Lin, 1977; Rabkin and Struening, 1976).

The epidemiological and life stress studies are only suggestive of the stress reducing role of social support networks. There are, however, a growing number of studies which have actually examined network characteristics in relation to a number of specific situations. One group of studies has focused on social support network influences on psychiatric disorder (Mueller, 1980). Findings from several studies are quite consistent, showing patients suffering from major psychiatric illnesses to have social support networks characteristically different from those of neurotic and normal samples. Specifically the psychotic group had very small primary networks (4 or 5 persons) which consisted mostly of family members. These networks tended to be highly interconnected (dense); and the individual links within the system were ambivalent and asymmetric. More open friendship networks were virtually nonexistent (Pattison et al., 1975; Henderson et al., 1978; Horwitz, 1977; Tolsdorf, 1976). Primary networks of neurotics were intermediate in size between psychotics and normals, consisting of 10 to 12 persons, often including significant persons who were no longer living or lived far away. Network density tended to be very low, with the neurotic person forming the hub of a wheel whose spokes were not interconnected. Neurotics also reported many more negative social interactions with network members than did controls. Impressively, the Henderson study reported that measures of social bonds, taken together, accounted for 47 per cent of the variance of neurotic symptoms. A further study, carried out in a single room occupancy hotel in New York City, and utilizing field observation as opposed to self report data, again found degree of psychiatric disability related to network size,

and number of multiplex, instrumental, and reciprocal relationships. In addition other studies have shown prior social contact patterns to be prognostic of outcome for schizophrenic patients and that network changes are associated with changes in schizophrenic symptomatology (Sokolovsky, et al., 1978; Hawk, Carpenter, & Strauss, 1975).

Normal control groups in these psychiatric studies consistently were found to have larger, less dense networks. Indeed, a variety of studies of groups of "normal" subjects demonstrate high levels of consistency despite differences in target populations and data gathering techniques (Hammer et al., 1978). Reviewing data from studies of urban, suburban, and rural networks in the United States, middle and working class networks in Britain, and networks in Malta and Africa, Hammer et al. report the following regularities: "An individual's networks typically consists of perhaps 6 to 10 intimately known individuals, most of whom are known to each other, and an additional 30 or so individuals who are also seen regularly by the focal individual - ie., a total of about 40" (p. 523). They go on to say that the range is about 25 to 50, with approximately 20 per cent of the possible connections actually occurring (eg., density is 20 per cent). The network form usually consists of 6 or 7 highly dense clusters with little or no connection across clusters. While no data is available for the population of dialysis patients, it is widely speculated that dialysis patients experience a "shrinking of their networks after they start regular dialysis treatments (Czaczkes and DeNour, 1968).

A second group of network studies has focused on network influence on utilization of health care services (Mckinlay, 1972, 1973; Salloway and Dillon, 1973). Mckinlay found that, after controlling

for socioeconomic status, education, proximity to services, and length of residence, underutilizers (in this case, pregnant mothers who did not become involved with routine prenatal services) depended on an undifferentiated group of readily available relatives and friends as lay consultants in lieu of professional health care providers. Their networks were dense, showing an interlocking kin and friendship network with whom they displayed a higher frequency of interaction. Utilizers on the other hand had more distinct and separate friendships and family networks and tended to make greater use of their friendship network. McKinley explains his findings in terms of the age structure, and by inference, the normative makeup of what has been called the "lay referral structure" (Friedson, 1960). According to Friedson, "...the whole process of seeking help involves a network of potential consultants from the intimate and informal confines of the nuclear family through successively more select, distant and authoritative layman until the 'professional' is reached" (p. 146). Presumably then, McKinley's findings might be explained in that underutilizers were enmeshed in relatively more dense, less differentiated networks whose values and norms relative to health behaviours were fairly homogeneous and did not place high value on utilization of professional prenatal services. Utilizers having access to both younger and more extensive friendship networks distinct from their family networks, were more likely to be exposed to social influences and normative expectations more akin to those of health care professionals. McKinley (1973) states: "respondents with proximate, close-knit and interlocking social networks will be likely to display greater conformity with their reference groups than will respondents with relatively

inaccessible, loose-knit, differentiated, social networks who may display conformity with, or take a positive orientation to, a non-membership group and employ it as a frame of reference" (p. 288).

Salloway and Dillon (1973) in a closely related study, provided additional support for this point of view. They found that higher utilization of health services was directly related to overall network size, decrease in per cent of family membership in the network, and amount of role support provided by friendship versus family sub-systems. Noting the striking difference in the direction of effects of friend and family networks, the authors speculate that friend networks operate as systems sharing current information about health services while family networks operate more as role support systems.

A study of how families coped with the crisis presented by a husband's myocardial infarction unveiled a similar pattern to that found in other health care utilization studies. Wives whose husbands had successful outcomes tended to be those who acknowledged support (in terms of lay help and consultation) from a wider range of sources, among whom husbands and non kin appeared to be most important. Wives of husbands with less favorable outcomes utilized a narrower range of supports, often restricted to members of the families of origin of one or both spouses.

Finally, health care utilization studies seem to show these behaviors are related to: (1) the prevailing norms and values of the social network to which a potential patient relates (family networks consisting of a higher percentage of older members tend to have more outdated, inaccurate health care attitudes) and (2) relative number of lay consultants who are interposed between first perception of symptoms

and contact with a health professional (smaller, denser networks encourage more "internal" requests for assistance before seeking "outside" help (Friedson, 1960).

Although no study to date has attempted to evaluate relationships between social network characteristics and compliance to a medical regimen, a few studies have examined network variables in relation to preventative health behaviours (PHBs) (e.g., personal hygiene, medical checkups, dental care, screening exams, immunizations). Suchman, (1965) first theorized and demonstrated that the more "parochial" the social group (indicated by ethnic exclusivity, friendship solidarity, and traditional/authoritarian family relations), the more likely a person is to hold "popular" health orientations, and be less compliant to the norms of the medical profession. Pratt (1972) found that couples with traditional, conjugal roles (unequal power in decision-making, strong sex role differentiation, and low companionship) engaged in significantly fewer PHBs. Salloway and Dillon (1973) presented evidence to support the hypothesis that frequent interaction with non-kin, as opposed to relatives, is positively associated with PHB.

The most thorough study to date assessed network influences on both "direct risk" PHBs (e.g., driving or walking recklessly or putting yourself in contact with smoke or germs) and "indirect risk" PHBs (e.g., failure to keep regular medical or dental checkups) (Langlie, 1977). A number of social network variables were found to be significantly related to indirect PHB. Specifically, indirect PHB was positively associated with high socioeconomic status (both of family and neighbourhood), frequent interaction with non-kin, and nontraditional

family structure. Direct risk PHBs (dialysis noncompliance would have to be considered a "direct risk" health behaviour) were found unrelated to network characteristics in this study. One explanation suggested by Langlie for these null results for "direct risk" PHB was that there was little variation in the level of direct risk PHB as measured in this study, so that only very strong relationships would have been able to show up.

Summary

A review of the compliance literature reveals mostly negative or inconclusive findings. Features of the disease and the therapeutic regimen, the personality, intelligence, and sociodemographic characteristics of the individual all fail to show any consistent relationships to compliance behaviour. Elements of the Health Beliefs Model, knowledge of the illness, appreciation of the seriousness, and of the efficacy of the treatment regimen, show promising positive results in approximately half of the studies in which they have been investigated. However, the one investigation of these predictors in relationship specifically to hemodialysis compliance by Cummings (1980) failed to support the Health Beliefs Model.

In both the broader compliance literature, encompassing adherence to a variety of different medical regimens, and in the specific hemodialysis compliance literature, the variables most consistently found to be correlates of compliance are noteworthy for their similar emphasis on the nature and quality of interactions between the patients and their significant others: supportiveness of

family and friends, family stability, moderate level of family involvement, patient satisfaction with their relationship with health care providers, and congruence of patient and provider expectations about each other's behaviour.

At the same time that these compliance research findings seem to increasingly point towards the importance of social support factors, investigations of social support are demonstrating the major influence that structural and dynamic characteristics of a person's support system can have on mediating the effects of a variety of stressors, including chronic illness. Thus an investigation of the relationship between social support system characteristics and compliance seems most timely. This is particularly so given the development of the social network model and methodology which in the past decade have proven most useful in studies of people's successful adjustment to difficult life changes.

Findings from the recent network studies suggest that there may be network configurations which are conducive to meeting people's specific needs in a given situation. Access to needed new information about, for example, health care services is probably best served by a less dense, more heterogeneous, less nuclear-family-dominated, large network, whereas maintenance of a strong sense of unchanging identity is better served by a network of small size, strong ties, high density, high level of cultural homogeneity, and low degree of dispersion of membership (Walker et al., 1977). While these statements can only be considered tentative at this time, based, as they are, on only a few preliminary reports, the research to date

certainly indicates that the application of the social network model holds much promise for greatly increasing our understanding of the influence of social support systems on a variety of adaptive and maladaptive behaviours.

With respect to compliance behaviour specifically, several tentative hypotheses may be advanced, based on the psychiatric, health care utilization and preventative health behaviour studies already cited.

Hypotheses

Although smaller, more dense, and homogeneous networks are considered to best provide an empathic kind of emotional support (Caplan, 1974; Walker et al., 1977), this prediction is contingent on a similarity of experience between the individual and the network members. This is not the case for dialysis patients, whose friends and family members not infrequently are repelled by the patient's entrance into dialysis treatment and deliberately disassociate themselves from this aspect of the patient's experience. In addition, diagnosis of a major psychiatric illness has been clearly correlated with all types of noncompliance as well as a particular support network configuration (e.g., small, dense, nuclear-family-dominated) (Haynes, 1979; Tolsdorf, 1975). Finally, both the health care utilization and preventative health behaviour studies find larger, less dense networks associated with increased use of and cooperation with health care delivery systems (Langlie, 1977; McKinley, 1973).

Hypothesis One: Patient compliance will be greater where that patient's social support network is found to be large, less dense,

and more heterogeneous (e.g., in terms of multiple sociodemographic characteristics).

Several reports have suggested that over-reliance on immediate family to the exclusion of other separate extended family, friendship, and workmate sectors is associated with lower utilization of health services (McKinley, 1973; Salloway, 1973). Noncompliance on dialysis, specifically, has been shown to be associated with over-involved, smothering families (Sherwood, in Yallen, 1980); a finding similar to that of network studies of severely disturbed psychiatric patients (Horwitz, 1977). On the other hand, it seems likely that dialysis patients who allow themselves to build close relationships with dialysis staff are more likely to incorporate dialysis values about the importance of compliance.

Hypothesis Two: The larger the percentage of immediate family members, the less compliant the patient will be.

Hypothesis Three: The larger the absolute number and the higher the percentage of linkages to medical personnel on the dialysis unit, the more compliant the patient will be.

A number of relationship characteristics (characteristics of the individual linkages) are thought to be important to maintaining compliance. Amount of support, level of satisfaction with the relationship, and degree to which the patient's expectations are met, have been found to be correlated with compliance in separate studies not using network methodology (Haynes, 1979). Others have speculated that degree of reciprocity is important where the focal individual is the recipient of support or services but has no opportunity to

reciprocate, or where the person feels in a "one-down" position the individual may be less satisfied with that relationship (Erikson, 1975). Studies of networks of psychiatric patients find the most disturbed patients involved in large numbers of dependent, uni-directional relationships (Sokolovsky et al., 1978). Linkages containing more than one content area (multiplex versus uniplex) are generally considered to be more powerful and important to the focal individual (Tolsdorf, 1976), so that the relative proportion of multiplex and uniplex relationships in the network is potentially important. Finally, a number of reports suggest that network stability and ease of contact between network members are important considerations in determining the networks ability to provide support for the focal individual (Erikson, 1975; Haynes, 1979).

Hypothesis Four: Those social support networks associated with most compliant patients will have relationships characterized as: desired interactions providing assistance, demonstrating mutual trust, concern, and having similar values, being reciprocal, multiplex, long-standing, with close geographic proximity, and frequent contact.

The ability of network members to be empathic and supportive of the dialysis patient might reasonably be expected to hinge on their level of awareness of the patient's general medical problems and, specifically, the demands of their dialysis regimen.

Hypothesis Five: Members of compliant patient's networks will be characterized by the patient as more aware of the patient's medical situation generally and the necessity of compliance to the

dialysis regimen specifically.

Dialysis patients report various degrees of positive or negative influence by their friends and family relative to remaining compliant.

Hypothesis Six: The more positive the overall influence of network members, taken together, the more compliant the patient will be.

Finally, Caplan (1974) has identified stable, continuous networks as being most likely to provide needed emotional support. If emotional support is a key determinant of dialysis compliance, then it can be expected that compliant dialysis patients will report less change in their network relationships since onset of end-stage kidney disease.

Hypothesis Seven: Compliant patients, as a group, will report less perceived change in their social support network, as measured by averaging perceived change in each of their individual network relationships.

Although these specific hypotheses are put forward based on the findings from associated network studies of health care utilization and preventative health behavior studies, no network research has been done to date specifically on compliance behavior. It may well be that there is no single network type which provides the optimal support necessary for compliance to a dialysis regimen. Rather, it may be the case that two or more constellations of network factors are to be found associated with compliance depending on different patients' needs from those networks. This study will permit the exploration of such outcomes.

CHAPTER 2

METHODOLOGY

In order to study the hypotheses, a static group comparison design was used (Campbell & Stanley, 1963) in which 20 compliant and 20 non-compliant subjects were matched in pairs on seven sociodemographic variables and two medical history variables. Comparison of the network characteristics of these two groups were then carried out using matched pair statistics.

Choice of Compliance Measure

As already noted in Chapter 1, hemodialysis requires adherence to a multifaceted regimen, which includes restrictions on fluid intake and diet, following complicated drug therapy schedules, and keeping appointments for frequent medical diagnostic tests as well as regular, often stressful, dialysis sessions. Although compliance to each of these requirements has important life-prolonging consequences for the chronic dialysis patient, it is generally agreed that compliance to fluid restrictions presents the greatest problem for both dialysis patients and the medical personnel responsible for their treatment.

While some dialysis studies have investigated and developed measures of more than one form of compliance within the same study (Cummings, 1980), the choice in this study was to examine only interdialysis weight gains, a relatively uncomplicated direct index of a patient's adherence to the restrictions on his fluid intake

between dialysis treatments. The decision to exclude measures of other compliance behaviours was based on the fact that virtually all of the other compliance indices involve significant measurement complications. For example, dietary noncompliance has been assessed using a patient's blood serum potassium, phosphorus, and blood urea nitrogen (BUN) levels. However, a patient's BUN level reflects not only what he has eaten but also his protein metabolic rate, the rate at which his particular unique digestive system breaks down protein. A patient's blood potassium level is effected not only by what he eats, but also the molarity of the potassium dialysate bath used in his dialysis treatments. Interdialysis weight gains, on the other hand, are easily measured and records exist for all patients at the hospitals utilized. Finally, nonadherence to fluid restrictions is the most prevalent form of nonadherence in the dialysis population, is said to be the most difficult to change by dialysis patients, causes the greatest degree of consternation for dialysis medical and nursing personnel, and, without any doubt, is one of the most dangerous forms of non-compliance in any medical population.

Subjects

Forty adult end stage renal disease patients, on maintenance hemodialysis for at least six months and currently being dialyzed in the Henry Ford Hospital or Good Samaritan Hospitals in Detroit, Michigan, were selected for this study based on the following procedure.

Interdialysis weight gains were recorded for all maintenance hemodialysis patients at Ford Hospital for a period of three months

in order to determine the mean and standard deviation parameters for this compliance measure in this large population of patients. (n = 138). Figure 1 shows the distribution of three month mean interdialysis weight gains for this chronic hemodialysis patient population at Fairlane and Troy satellite clinics of Ford Hospital. The mean for these three month average weight gains is 2.67 kilograms with a standard deviation of 1.02 kilograms. The shape of the curve demonstrates that this form of compliance appears normally distributed in this dialysis population.

Although the ideal is to use a biological basis for selecting a cut-off point between compliance and noncompliance (Gördis, 1976), no such value has been empirically determined for chronic hemodialysis patients' fluid compliance. The acceptable level most often cited in the dialysis literature, and by the staff at the two hospitals used in this study, as indicative of compliance is one kilogram per day. The strategy in this study was to define compliance and noncompliance on a strictly statistical basis as those levels of mean interdialysis weight gains at least one standard deviation below or above the overall population mean. The decision to sample from either end of the compliance-noncompliance continuum was based on the results of an earlier compliance study at Ford Hospital by Cummings (1980) in which the influence of his predictor variables appeared to be erased by a low amount of variance for mean interdialysis weight gains.

All dialysis patients whose three month average weight gains were at or above the 370 k μ ms. per/day level were identified as a pool of potential noncompliant subjects for this study. Patients in this pool were approached randomly and asked to participate in the study

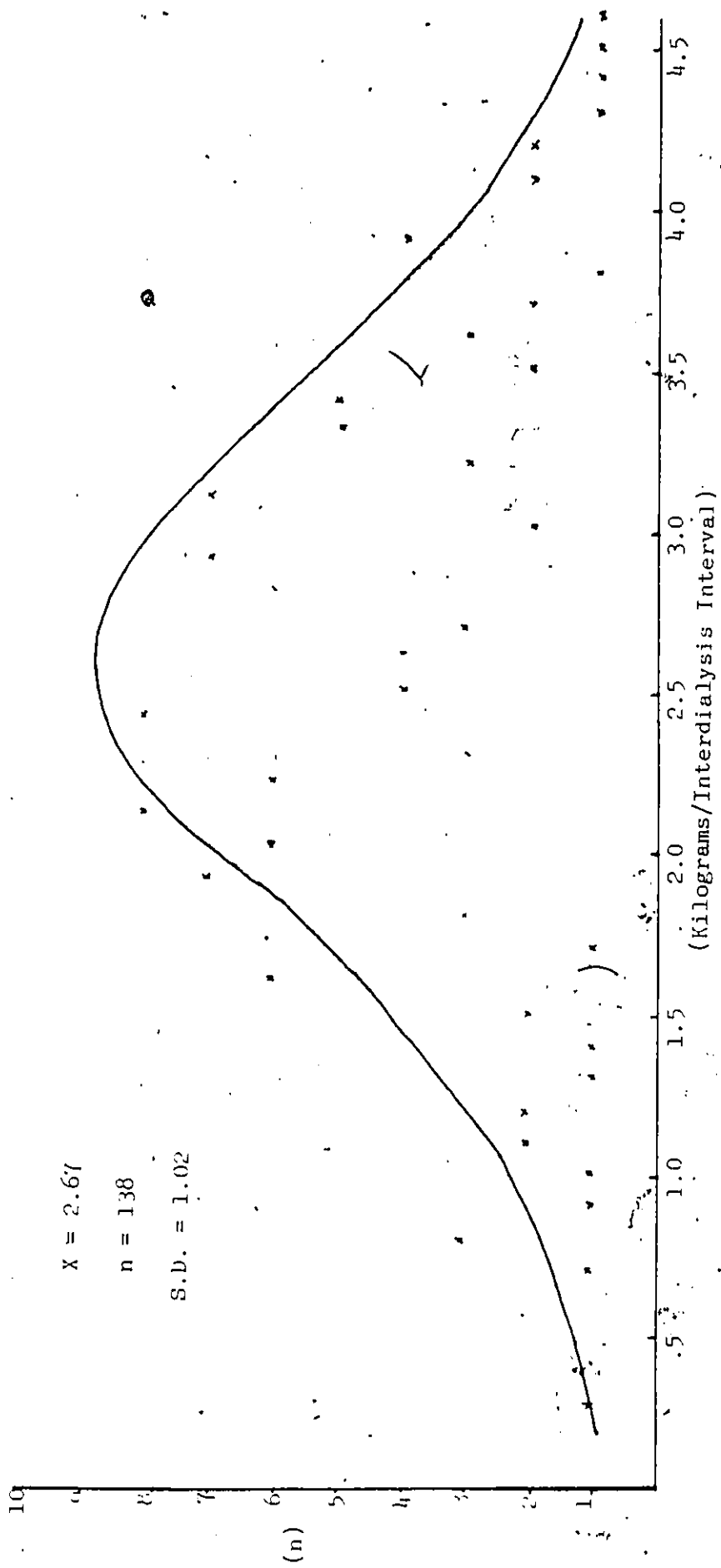


Figure 1. Distribution of 3-month Interdiagnosis Weight Gain Averages

until a group of 20 noncompliant patients had been generated. Subsequently, a group of 20 compliant patients were enlisted from the compliant end of the distribution in the following manner. Each of the compliant subjects was matched as nearly as possible with a non-compliant patient on the variables, age, sex, race, marital status, employment status, years of education, income, time on dialysis, and amount of residual fluid output per day.

A comparison of compliant and noncompliant group demographic characteristics was carried out to assess the adequacy of the matching procedure on these nine variables. Matched pair t-tests or chi-square analyses were performed. The results of these analyses are shown in Table 2. With one exception, there are no significant differences ($p < .10$) between patients in the compliant and noncompliant groups. The only significant difference between the groups is for patient age. The compliant group's mean age is slightly older than that of the noncompliant group (a 2.75 year difference, $p < .054$). The less rigorous unmatched t-test was also carried out and this analysis shows no significant difference between groups on age ($p < .50$). An examination of the baseline data showed that 75 percent of the paired patients were within 5 years of each other. The other 5 pairs showed age differences between 8 and 13 years. At least part of the difficulty matching these last five pairs on age can be attributed to the difficulty locating sufficient numbers of young black male and black female compliant patients in the Ford Hospital population of dialysis patients.

All subjects had been on dialysis at least six months at the beginning of this study. Most had been on dialysis considerably

TABLE 2

A COMPARISON OF PATIENT CHARACTERISTICS BETWEEN GROUPS

Measure	Noncompliant Group (n=20)	Compliant Group (n=20)	Statistics* (Group 1 vs. Group 2)	
<u>A. Socio-demographic variables</u>				
Mean Age (years)	46.85	49.6	t = 2.05	p = .054
Percentage male	40%	40%	$\chi^2 = 0.00$	n.s.**
Percentage Black	75%	75%	$\chi^2 = 0.00$	n.s.
Percentage Married	55%	75%	$\chi^2 = 1.758$	n.s.
Percentage Employed	20%	30%	$\chi^2 = .533$	n.s.
Mean educational level (years completed)	11.05	11.0	t = 0.10	n.s.
Percentage at income level	10k 45% 10-20k 35% 20k 20%	10k 50% 10-20k 30% 20k 20%	$\chi^2 = .150$	n.s.
<u>B. Medical history variables</u>				
mean number of years receiving dialysis treatments	4.00	3.85	t = 0.27	n.s.
mean urine output (cups/day)	0.40	0.61	t = 0.58	n.s.

* t.- tests are for matched pairs

** n.s. means p > .10

longer. The average for both groups was nearly four years. The actual values of all demographic and medical history variables for each pair are presented in Appendix A.

Procedure

Subject recruitment. As noncompliant subjects and their matching compliant partners were identified, each were approached during their regular dialysis treatment and asked to participate in a study "of dialysis patients' support networks." They were told that they would be asked to make a list of important people in their lives, family, friends, coworkers, or others whom they knew and regularly interacted with, and to describe their relationships with each of these people. The patients were also informed that all interviewing would be carried out during their regular dialysis treatments. Confidentiality was stressed together with the patient's right to terminate interviewing at any time, for any reason, without prejudice to them. If the patient then agreed to participate, he or she was asked to sign a consent form³, which had been approved for this research by the Project Research and Human Rights Committee of Henry Ford Hospital.

There were 13 potential subjects for this study who declined to participate when they were approached. Another four subjects withdrew from the study after the data gathering process had begun. Breaking this down by group, 11 noncompliant patients refused to participate, the most common reason being that the patient felt he or she had few

³A copy of the patient consent form appears in Appendix B. Every effort was made to develop a good working rapport with potential subjects. Considerable time was spent in the initial interview talking informally with the patients about their particular dialysis situation.

friends or family to report about. Other noncompliant refusers felt the material inquired about was too personal and some simply gave no explanation for not wishing to be in the study. One noncompliant patient withdrew from the study when he was able to have a kidney transplant.

In contrast, only two compliant patients refused to participate in the study, both being concerned about the confidentiality of the shared information. Three other compliant patients withdrew from the study after they had started. Two of these three subjects felt that the study would take up too much of their time, while the third felt that the questions being asked were too personal.

The three noncompliant patients who refused because they had few friends or family gave similar explanations. A white male in his early 40's stated, "I don't have that many people in my network. I'm kind of a loner anyhow." A divorced black female in her 50's said, "I haven't much to tell you. I'm a loner. I keep to myself, live alone, and don't tell too many people my business." Another black woman in her 50's responded, "I can't help you. I don't have anybody. All my people have died. Now I don't talk to anyone much, just keep to myself. I don't have any friends."

Data Collection Procedure. The procedure by which network members are elicited is of central importance in any network study as it determines who is included or excluded from further study and, so, acts as the operational definition of the network. The way in which the initial inquiry into network membership is phrased opens the way to a more inclusive or more selective network. Typically

network researchers have asked one basic question that calls on the respondents to name people "whom they felt close to or whom they knew well" (Tolsdorf, 1978, p. 9) or those adults "whom they saw at least once a month and whom they considered to be important in their lives" (Brim, 1974, p. 435).⁴ Other investigators have asked respondents to name people in particular role relationships to them (kin, friends, work associates, and neighbors (Henderson, 1978)). McCallister and Fischer (1978) note that each of these approaches tend to sample certain sectors of networks at the expense of others and lends itself to measurement error through variable interpretations of such key terms as "best friend" and "important." They recommend use of a series of ten name-eliciting questions covering specific relationship contents such as: "who would care for a respondent's home if he went out of town" and "who would they talk to about their personal worries." These questions, while appropriate for a quick network survey of a large population (the purpose for which they were designed), seem too culture bound and limited in the relationship types they tap. Given the socioeconomic heterogeneity of the dialysis population studied, it seemed best to use a single, more general form of inquiry.

The method of inquiry originally decided on for this study involved a sequential inquiry procedure, asking patients first to (a) list people they knew well, and then identify from this original list (b) important people and (c) "the most important people" in two

⁴A more complete list of operational definitions of network membership taken from Mitchell & Trickett (1980) appears in Appendix C.

subsequent reductions. After interviewing the first four subjects, however, it became evident that, even at the broadest level of inquiry, the dialysis patients in this sample tended to give very abbreviated lists of support persons, sometimes as few as three or four people and often only included family members. The inquiry strategy was therefore changed to one more conducive to eliciting a more "liberally" defined support network. Patients were asked to list "all those people, relatives, friends, work associates, or others whom you consider in some way a part of your network of support people." Extensive probing was carried out for any individuals or groups of individuals the patient might have omitted. The only network members automatically excluded in the inquiry procedure were children under the age of twelve and people whom the patient had not had any kind of contact with in over a year. The original four subjects were reinterviewed.

Following identification of each patient's network membership, a series of inquiries was conducted to elicit network characteristics. The first series of questions asked which members of the network knew each other. In the inquiry, emphasis was placed on including only those linkages between network members that constituted more than "a passing acquaintance" and were based on more than the fact that both happened to know the patient. This information was gathered for all members of each patient's network and served as a measure of the patient's network density or degree of interconnectedness.

Following determination of network density, patients were asked to answer a series of questions describing each member of their

network. Specifically, they were asked to describe their relationships to each network member in terms of (1) the type of relationships they have with this person (e.g., immediate family, extended family, close friend, work associate), (2) the length of time they have known this person, (3) the frequency of contact with this person, (4) the distance this person lives from them, (5) the type of support available in the relationship (based on Brim's 5 social relationship factors - assistance, trust, value similarity, concern, and desired interaction) (Brim, 1974), (6) the degree of reciprocity or symmetry in the relationship, (7) the degree of similarity with the patient on a variety of demographic variables, (8) the extent of the network member's awareness of the patient's dialysis treatments generally and the difficulties of being compliant to the multiple regimens specifically, (9) the degree of influence the network member has exerted on the patient relative to their compliance behaviour, and (10) the degree of change in the relationship, positive or negative, since the patient first developed end stage renal disease.⁵

Predictor Variables

The following operational definitions were used for the predictor variables, the network characteristics, measured in this study.

Network Size - 1. This is the number of people the patient listed in response to the initial inquiry and probing.

⁵The complete questionnaire used to evaluate network characteristics can be found in Appendix D.

Network Size - 2. The second size determination is the number of original network members who achieved a summed score of 25 or more out of a possible 65 on the 13 Brim support items.

Density. As described above, patients were asked to report which members of their network have a relationship with other members of their network independent of their mutual relationship with the respondent. Density was computed by dividing the actual number of cross linkages by the total number of possible linkages in a network of that size.

Kinship Percentage. This variable was determined by dividing the number of close and extended kin members by the total number of network members.

Network Homogeneity. Each patient was asked to report whether each of their network members was alike him in sex, age (if the patient was 30 or younger, a 5 year difference or less was considered "alike." If the patient was over 30, a 10 year or less difference was considered "alike"), race, level of education (within 3 years), political beliefs (conservative, moderate, liberal), religious beliefs (Protestant, Catholic, Jewish, agnostic, other), medical situation (presence of a chronic debilitating illness) and neighborhood lived in (lives within walking distance of the patient). Network homogeneity was computed by averaging the percentage of "alike" characteristics across all of the patient's network members (Appendix B, item 5).

Multiplexity. This construct relates to the number of different types of relationships the respondent has with each of his network

members. Each of the patients in this study was asked to check all of the following relationship types which apply for each of his or her network members: immediate family, extended family, close friend (excludes family members), secondary friend (excludes family members), economic, medical, recreational, political, religious, sexual, fraternal, mutual aid, service, or others specified by the patient. Network multiplexity was computed as the percentage of network members with whom the patient has more than one type of relationship.

Medical/Dialysis Percentage. This is the proportion of network membership who were medical or dialysis unit personnel or other dialysis patients.

Duration. This variable was measured using a single questionnaire item. The patient was asked "How long have you known this person?" The network score was an average computed from all network members (item 2).

Frequency. A single item, "How often do you have contact with this person by phone, letter, or in person?" was used. Again, a network score was computed as the average across all network members (item 3).

Proximity. For each network member, the patient was asked "What distance does this person live from you?" A simple average was computed across all network members to represent the total network score on this variable (item 4).

Relationship Content. As noted in the introduction, various content dimensions have been postulated by network researchers (Mitchell & Trickett, 1980). Considerable commonality was noted across these dimensions in five different studies. For the purposes of this study, the five social relationship factors

identified by Brim (1974) were adopted as basic content dimensions to be assessed. These five factors emerged clearly in two separate studies by Brim using two reasonably distinct populations. Item loadings showed excellent discrimination between the five dimensions: assistance, value similarity, trust, desired interaction, and concern.⁶ Patients were asked by the interviewer to indicate, for every network member, how likely he or she would be to perform each of the 13 behaviour items vis-a-vis that network member. A five point scale was used ranging from "strongly agree" to "strongly disagree" with a mid-scale response of "undecided." Five separate content scores were computed for each relationship variable by a summing of the item scores. Network scores for each subject were computed as simple averages across all network relationships (items 9-21).

Relationship reciprocity. As a measure of the degree of symmetry or reciprocity in the network relationship, three items were chosen from the Brim scale. The single highest loading item on the desired interaction, assistance, and trust factors were then reversed so that they now asked the patient how likely the network member was to perform this action vis-a-vis the subject. Thus, the original trust dimension item, "I would discuss with him or her some psychological problems I was having if I needed to talk about them with somebody," became "He or she would discuss

⁶The 13 content questionnaire items and their factor loadings on each content dimension as reported by Brim (1974) can be found in Appendix E. The items used for each content variable are identified in Appendix E.

with me some psychological problem he or she was having, if he or she needed to talk about it with somebody." Relationship reciprocity was computed as the difference in how the patient answered these three items in the original and reversed forms. An overall network score for each subject was computed as the average of the individual relationship scores (items 6 and 9, 7 and 15, 8 and 17).

Dialysis Awareness and Compliance Awareness. Each of these variables were also assessed using a single questionnaire item: "To what extent is this person aware of your medical situation and dialysis treatments?" and "To what extent is this person aware of the limitations dialysis places on you in terms of diet, limited fluids intake, and need for medications?" Network scores were again an average across all the individual relationships (items 22 and 23).

Influence. The degree to which the patient had experienced either positive or negative influence from his or her network members in regard to maintaining their dialysis regimen was assessed with a single item, "How often has this person attempted to influence you toward greater or lesser compliance to your dialysis restrictions?" In this case the network score was a simple sum of influence reported in the individual relationships. Individual scores could range between "often attempts to influence me in a negative direction" (-2) to "often attempts to influence me in a positive direction" (+2) (item 24).

Change. The degree to which the patient had experienced a positive or negative change in his or her relationships with network members was assessed using a single item, "How has your

relationship with this person changed since you have been on dialysis?" Individual scores could range from "much worse" (-2) to "much better" (+2). Network scores were computed by averaging the individual scores (item 25).

The last two variables looked at, support quotient and intensity, are derived from the original variables and therefore will not be entered into the multivariate analyses to be performed. Matched pair t-tests will be performed for these variables as for all the other predictor variables.

Support Quotient. This second order variable was computed for each relationship using the five Brim (1974) support scales: desired interaction, trust, value similarity, concern, and assistance. A network "support quotient" was obtained by taking an average of the individual relationship scores.

Intensity. Also a second order variable, intensity was computed by averaging all of the content scores (Brim scale) together with the variables, duration, frequency, proximity, homogeneity, and reciprocity. The implicit assumption in computing this variable was that the degree of intensity in relationships would be reflected as the product of degree of trust, concern, desired interaction, value similarity, and assistance. Furthermore more intense relationships would be characterized by longer duration, greater frequency of contact, living in closer proximity, and higher degree of homogeneity and reciprocity.

CHAPTER III

RESULTS

The results will be presented as follows: (1) the comparison of individual network characteristics for the compliant and noncompliant groups, (2) Pearson product-moment correlations between individual network characteristics and the actual computed average compliance levels achieved by individual subjects in this study (the basis for group membership in this study), (3) the predictive ability of the all-variable model to correctly classify subjects into their respective groups as determined by a discriminant function analysis, (4) Pearson product-moment correlations between the network variables themselves, and (5) results of exploratory stepwise regression and factor analytic techniques.

Comparison of Network Characteristics

The principle purpose of this research was to describe and compare the social support network characteristics of compliant and noncompliant hemodialysis patients. The relationships between the individual network characteristics (i.e., predictor variables) and patient compliance were examined using matched-pair t-tests. Table 3 presents the mean, standard deviation, and t-test values for the 22 network characteristics and two summary network variables. With the exception of medical staff percent, no network characteristic

TABLE 3

A COMPARISON OF NETWORK CHARACTERISTICS BETWEEN GROUPS

Network Variable	Noncompliant Group		Compliant Group		Statistics (Group 1 vs Group 2)
	Mean	S.D.	Mean	S.D.	
<u>General Dimensions</u>					
Size 1	14.60	7.17	17.85	7.52	t* = 1.42 n.s.
Size 2	12.80	6.90	17.00	7.30	t = 2.01 p = .06
Density (%)	64	20	74	18	t = 1.67 p = .11
Multiplexity (%)	19	17	9	12	t = 1.81 p = .09
Kin Percent	59	22	68	17	t = 1.30 n.s.
Staff Percent	5.8	8.5	0.8	2.6	t = 5.78 p = .03
Duration	4.58	.30	4.73	.23	t = 1.60 p = .12
Frequency	3.20	.65	3.10	.52	t = 0.49 n.s.
Proximity	3.25	.44	3.04	.40	t = 1.32 n.s.
Homogeneity (%)	52	7	55	6.4	t = 1.51 n.s.
Reciprocity	2.32	.90	1.92	.92	t = 1.54 n.s.

Continued.

TABLE 3 Continued

Network Variable	Noncompliant Group		Compliant Group		Statistics (Group 1 vs Group 2)
	Mean	S.D.	Mean	S.D.	
<u>Relationship Content</u>					
Desired Interactions	10.16	2.26	10.90	1.98	t = 1.28 n.s.
Assistance	9.19	2.70	8.94	2.08	t = 0.31 n.s.
Trust	10.44	2.67	10.79	2.22	t = 0.53 n.s.
Value Similarity	10.58	2.26	11.22	1.84	t = .094 n.s.
Concern	3.29	1.07	3.53	0.97	t = 0.97 n.s.
Dialysis Awareness	3.73	0.52	3.86	0.66	t = 0.81 n.s.
Compliance Awareness	3.05	0.47	3.27	0.60	t = 1.64 n.s.
Perceived Influence	8.25	7.56	9.45	10.51	t = 0.46 n.s.
Perceived Change	0.27	0.21	0.36	0.31	t = 1.22 n.s.
<u>Summary Measure</u>					
Support Quotient	43.21	8.97	45.33	7.11	t = 0.80 n.s.
Intensity	34.68	4.44	35.64	2.97	t = 0.86 n.s.

* all t - tests are for matched pairs

showed a significant difference at the $p \leq .05$ level. The findings in relation to medical staff percent showed, contrary to prediction, the noncompliant patients' networks included a higher percentage of members who are physicians or dialysis staff people (see Hypothesis Three). Eight noncompliant patients included at least one medical staff person in their network, while only two compliant patients included any medical person in their network. Across both groups, medical staff inclusion in patient support networks was generally low, the maximum level of staff inclusion being 25 percent. On average, medical personnel made up 5.8 percent of noncompliant patients' networks and only 0.85 percent of compliant patients' networks.

Using a less stringent level of significance, five other variables — size -2, density, multiplexity, duration, and compliance awareness suggest a possible trend in the data. These trends suggest that fluid compliant dialysis patients tend to have social support networks which can be characterized as larger,⁷ more dense, and more long-standing. Compliant patients also tend to have networks with a smaller percentage of relationships which were multiplex. Of these suggestive trends, four were in the predicted direction (see Hypothesis One, Four, and Five).

⁷Size -2 was determined by elimination from the original network list (size -1) those members who failed to provide a minimum level of support as measured by the five support scales (desired interaction assistance, trust, concern, and value similarity).

The findings with respect to the network density dimension were opposite to the prediction that compliant patients would have less dense networks (Hypothesis One).

Null results were obtained for comparisons of all other network dimensions. No differences were found for any of the five relationship content variables: desired interaction, assistance, trust, value similarity and concern. Other individual network dimensions which failed to differentiate between compliant and noncompliant groups were: size -1, kin percent, frequency, proximity, homogeneity, reciprocity, dialysis awareness, perceived influence, change, the overall support quotient, and intensity. However, eleven of these 16 comparisons, while statistically nonsignificant, were in the predicted direction.

Correlations with Individual Compliance

As a second means of evaluating the relationship between the predictor variables and compliance, Pearson product-moment correlations for these variables with individual three-month-average interdialysis fluid weight gains were examined. Recall that the averages were used to determine membership in compliant and non-compliant groups. When the predicted variable, individual weight gain average, was allowed a wide range of variation, instead of merely determining group membership, a number of the original relationships between the predictor network dimensions and compliance were found to be stronger and some reached levels of significance at $p \leq .05$. Table 4 shows the correlation coefficients for each network variable and three-month average weight gains.

TABLE 4
 PEARSON COEFFICIENTS FOR NETWORK VARIABLES
 WITH THREE MONTH AVERAGE
 INTERDIALYSIS FLUID WEIGHT GAINS

Network Variable	r_{xy} with 3 Month Compliance Average (n = 40)	Significance Level
Size 1	-.266	p = .10
Size 2	-.328	p = .04
Density	-.295	p = .07
Multiplexity	.313	p = .05
Kin Percent	-.306	p = .06
Staff Percent	.450	p = .004
Duration	-.337	p = .04
Frequency	.173	p = .29
Proximity	.312	p = .05
Homogeneity	-.155	p = .35
Reciprocity	.182	p = .27
Desired Interaction	-.140	p = .39
Assistance	-.002	p = .99
Trust	-.055	p = .74
Value Similarity	-.167	p = .31
Concern	-.147	p = .37
Dialysis Awareness	-.121	p = .46
Compliance Awareness	-.189	p = .25
Influence	.033	p = .84
Change	-.094	p = .57
Intensity	.129	p = .43
Support Quotient	-.142	p = .38

Staff percent size -2, density, multiplexity, and duration each demonstrated a significant relationship with compliance. An additional three variables - size -1, kin percent, and proximity - yielded correlation coefficients significant at the $p \leq .10$ level. These correlation analysis findings suggest further that compared with noncompliant patients, compliant patients have larger networks, which are more geographically spread out, and are made up of a greater proportion of family members. In summary, the findings in regard to individual network variables showed, with the exception of staff percent, no strong relationships to compliant group membership. Correlational analyses yielded five variables, staff percent, proximity, size-2, multiplexity, and duration, significant at the $p \leq .05$ level. Several other network dimensions, size-1, density, and kin percent demonstrated weak associations with compliance ($p \leq .10$).

A Test of the Overall Model

Although the individual network dimensions were the principle focus of this study, there was some interest in knowing how well the predictor variables taken together would do in predicting compliance or noncompliance. In order to determine this, a discriminant function analysis was carried out on the classification variable, group. Using all of the predictor variables together, the model was able to correctly classify 85 percent of the noncompliant group subjects and 95 percent of the compliant group subjects. The success with which these variables, taken together, predicted compliance, coupled with the relatively modest number of significant individual

predictor variables led to an interest in the underlying dimensionality of the predictors, and specifically the questions, "How are the predictors related to each other?", "What combination of variables best accounts for the variance in individual compliance?", and "Are their interpretable factors underlying the individual predictors, which are associated with compliance?" The first of these questions can be answered by looking at the correlation matrix for the predictor variables.

Correlations Between Network Variables

Pearson product-moment correlations coefficients were calculated in order to explore the relationships among all the predictor variables. Those correlation coefficients significant at $p \leq .05$ are presented in Table 5. A complete listing of all correlation coefficients for predictor variables in this study may be found in Appendix F. The number of correlations significant at the $p \leq .05$ level (65) was considerably larger than would be predicted by chance (9), suggesting considerable overlap in the dimensions assessed in this study.

One noteworthy finding was the unexpected set of strong positive correlations among all five of the Brim scales: desired interaction, assistance, trust, value similarity, and concern. With the exception of the correlation between assistance and concern, all of the inter-scale correlations were highly significant. These results were unexpected because two previous factor analytic studies (Brim, 1974) indicated that these scales assessed relatively independent relationship dimensions.

TABLE 5
PEARSON CORRELATIONS COEFFICIENTS FOR
NETWORK VARIABLES WITH EACH OTHER

Pair	(n=40) Correlation Coefficient	Significance* Level
Size 1		
Reciprocity	.402	p = .010
Size 2 and Reciprocity	.378	p = .016
Trust	.341	p = .031
Value Similarity	.326	p = .040
Support Quotient	.324	p = .042
Density and Multiplexity	-.365	p = .021
Kin Percent	.688	p = .0001
Duration	.516	p = .0007
Concern	.326	p = .040
Intensity	.321	p = .017
Staff Percent	-.414	p = .008
Kin Percent and Multiplexity	-.377	p = .017
Intensity	.433	p = .005
Support Quotient	.490	p = .001
Duration	.546	p = .0003
Desired Interactions	.441	p = .004
Assistance	.457	p = .003
Trust	.316	p = .05
Value Similarity	.395	p = .012
Duration and Desired Interactions	.389	p = .013
Assistance	.317	p = .046
Concern	.385	p = .014
Staff Percent	.332	p = .036
Frequency and Proximity	.440	p = .004

Continued

TABLE 5 CONTINUED

Pair	(n=40) Correlation Coefficient	Significance Level
Homogeneity and Trust	.356	p = .024
Value Similarity	.312	p = .050
Concern	.325	p = .040
Reciprocity	-.340	p = .032
Persued Interactions	.479	p = .002
Assistance	.356	p = .024
Reciprocity and Value Similarity	-.403	p = .010
Compliance Awareness	-.350	p = .027
Influence	-.331	p = .037
Desired Interaction and Assistance	.497	p = .001
Trust	.697	p = .0001
Value Similarity	.668	p = .0001
Concern	.721	p = .0001
Dialysis Awareness	.322	p = .042
Compliance Awareness	.364	p = .021
Influence	.489	p = .001
Assistance and Trust	.561	p = .0002
Value Similarity	.529	p = .0004
Trust and Value Similarity	.617	p = .0001
Concerns	.561	p = .0002
Dialysis Awareness	.483	p = .002
Compliance Awareness	.504	p = .0009
Influence	.463	p = .003
Value Similarity and Concern	.506	p = .0009
Influence	.510	p = .0008
Concern and Dialysis Awareness	.363	p = .021
Compliance Awareness	.340	p = .032
Influence	.432	p = .005
Dialysis Awareness and Compliance Awareness	.926	p = .0001
Intensity	.386	p = .014
Support Quotient	.384	p = .014

Continued

TABLE 5 CONTINUED

Pair	(n=40) Correlation Coefficient	Significance Level
Compliance Awareness and	Influence	p = .022
	Intensity	p = .008
	Support Quotient	p = .009
Influence and	Intensity	p = .0007
	Support Quotient	p = .0006
	Duration	p = .018
Support Quotient and	Homogeneity	p = .008

* Only $r_{xy} \leq .05$ are listed. The total number of correlations significant at the .05 level (61) are more than would be expected by chance (9.5).

While no attempt will be made here to discuss the implications of all the correlations presented in Table 5, a few observations can be made that have bearing on the results of regression and factor analytic analyses to be presented next. A more complete discussion of the import of these correlational findings can be found in Chapter 4.

Both size -1 and size -2 showed a moderate positive association with reciprocity. Larger networks in this population tend to have more reciprocal or symmetric relationships in which the dialysis patient feels he or she gives as much as he or she receives.

Four other variables, density, multiplexity, kin percent, and duration demonstrated a high degree of association with each other (the r_{xy} for multiplexity and duration, not listed in Table 5, is $-.297$, $p = .06$). Networks consisting of a high percentage of primary and secondary family members tended to also be more dense, more long standing, and consist of fewer relationships involving more than one type of role relations (e.g., family member, business associate, recreation partner). In addition, networks of relatively long duration and high density tended to be characterized by a low degree of medical or dialysis staff membership.

Results of Regression Analyses

The findings of modest correlations between some individual predictor variables and individual compliance averages, together with the high degree of intercorrelation among a number of the predictor variables, prompted the investigator to look for a more concise model with which to explain variation in compliance behaviour.

A stepwise regression procedure was carried out with a maximum R^2 improvement technique. This technique, rather than setting on a single model, looks for the "best" one-variable model, then the "best" two-variable model, and so forth. In each case, the procedure locates the model with n-variables that accounts for the maximum amount of variation in the dependent measure. The single variable added at each step is that which yields the greatest increase in R^2 . Table 6 lists the best 1-, 2-, 3-, 4-, 5- and 6-variable models for predicting 3-month individual compliance levels. Use of the individual compliance measure rather than group as the predicted variable was based on the fact that it encompasses a wider range of variation, being a true interval level measure. Results of the same stepwise regression analysis on the variable, group, is presented in Appendix G. The best n-variable models were nearly the same, although in each case the n-variable model predicted individual compliance levels considerably better than the variable, group.

The model achieving the best level of significance ($p \leq .0004$) included the variables size -2, proximity and staff percent and accounted for 38.9 percent of the variance on 3 month individual compliance, averages. As already noted, all three variables were independently associated with individual compliance averages at $p \leq .05$ level or better (Table 4) and their inclusion in this 3-variable model together suggests that they each are accounting for a different part of the overall variance on the dependent measure. Similarly the 6-variable model included four variables (size 2, multiplexity, proximity, and staff percent) which individually had

TABLE 6

BEST 1-, 2-, 3-, 4-, 5-, AND 6-VARIABLE
 MODELS FOR PREDICTION OF
 3 MONTH INDIVIDUAL AVERAGE COMPLIANCE

MODEL	VARIABLES	B-VALUES	F	SIGNIFICANCE	R ²
One Variable	Staff Percent	8.06	F(1, 38) = 9.65	p ≤ .0036	.203
Two Variable	Proximity Staff Percent	1.02 8.82	F(2, 37) = 9.37	p ≤ .0005	.336
Three Variable	Size -2 Proximity Staff Percent	-.039 .810 8.67	F(3, 36) = 7.65	p ≤ .0004	.389
Four Variable	Size 2 Proximity Change Staff Percent	-.044 .804 -.750 8.787	F(4, 35) = 6.26	p ≤ .0007	.417
Five Variable	Size 2 Multiplexity Proximity Change Staff Percent	-.042 1.103 .771 -.737 8.187	F(5, 34) = 4.65	p ≤ .0016	.458

Continued

TABLE 6 Continued

MODEL	VARIABLES	B-VALUES	F	SIGNIFICANCE	R ²
Six Variable			F(6, 33) = 4.69	p < .0024	.475
	Size 2	-.056			
	Multiplexity	1.214			
	Proximity	.708			
	Influence	.022			
	Change	-.837			
	Staff Percent	7.766			

X

shown modest relationships with individual compliance and were relatively unassociated with each other as assessed by Pearson product-moment correlations. Results of the stepwise regression procedure suggest that a more concise model, using network dimensions as predictors, could be constructed to account for differences in dialysis compliance. Further, they suggest that more than one network variable is important in this prediction of compliance.

Results of the Factor Analysis

In the next step, the network data were subjected to principle components factor analysis. Using a minimum eigenvalue cutoff of 1.0, six factors were generated, accounting for 73.7 percent of the common variance. Table 7 shows the eigenvalues and the portion of the common variance accounted for by these six factors. The six factors were rotated using the varimax technique. Predictor variable loadings on the six factors together with factor correlations with the two predicted measures, individual compliance averages and group, are presented in Table 8.

A single variable, change, loaded highly in a positive direction on Factor I which was, therefore, labelled Change. Five variables loaded highly on Factor II: density, duration, kin percent (in the positive direction) and multiplexity and staff percent (in the negative direction). Factor II was titled Family Enmeshment. Factor III, with its highest loadings being size -1 and size -2, was called Size. Factor IV, whose highest loading predictors were compliance awareness and dialysis awareness, was titled, Awareness of Medical Status. All

TABLE 7
EIGENVALUES AND VARIANCE
ACCOUNTED FOR BY FACTORS I-VI

Factor	Eigenvalue	Portion of Variance	Cumulative Portion of Variance
I	5.30	.265	.265
II	2.77	.139	.404
III	2.32	.116	.520
IV	1.86	.093	.613
V	1.32	.066	.679
VI	1.17	.058	.737

TABLE 8

ROTATED FACTOR PATTERN AND
PEARSON PRODUCT MOMENT CORRELATIONS
BETWEEN FACTORS AND COMPLIANCE

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Size 1	-0.06668	0.00310	<u>0.93082</u>	0.04205	-0.00011	-0.20145
Size 2	-0.02822	0.04290	<u>0.89553</u>	-0.00189	0.23583	-0.22240
Density	-0.14469	<u>0.78671</u>	-0.28938	-0.00128	0.27461	0.05414
Multipl	0.02045	- <u>0.64388</u>	-0.09139	-0.19791	0.08203	0.20260
Kinper	-0.26909	<u>0.66078</u>	-0.05630	0.01198	0.48483	-0.16936
Duratn	0.11573	<u>0.67572</u>	0.05679	-0.05277	0.34882	-0.11270
Freqncy	-0.05214	-0.12442	-0.06055	-0.01104	0.17865	<u>0.83291</u>
Proxmty	0.08694	0.04009	-0.26081	-0.20103	-0.10451	<u>0.67505</u>
Homogty	0.44812	-0.09939	0.30381	-0.00972	0.36595	0.38996
Recipty	-0.34903	-0.00192	+0.54875	+0.40575	+0.15001	+0.35051
Desint	0.28112	0.24535	-0.01245	0.18800	<u>0.81563</u>	0.17946
Asst	-0.38423	0.06938	<u>0.06884</u>	-0.09837	<u>0.77002</u>	0.04695
Trust	0.12090	-0.10910	0.12298	0.30741	<u>0.82147</u>	-0.06300
Valsim	-0.07471	0.11166	0.24163	0.21179	<u>0.75261</u>	0.01611
Concern	0.38614	0.25986	0.09690	0.19974	<u>0.62438</u>	0.10329
Davare	0.05907	0.03894	0.03312	<u>0.92823</u>	0.19590	-0.12170

Continued

TABLE 8 Continued

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Caware	0.14213	0.01614	0.10875	0.91271	0.22324	-0.09997
Inflnce	0.11479	-0.03150	0.47398	0.30780	0.41991	0.24448
Change	0.81363	-0.03513	-0.15986	0.13491	0.01897	-0.01449
Staflper	-0.09703	-0.71279	-0.11265	0.10881	0.21974	-0.22723
r_{xy} (Group)	.178	.415	.287	.129	-.005	-.051
(p)	(.271)	(.007)	(.073)	(.424)	(.978)	(.756)
r_{xy} (Comp 3)	-.136	-.453	-.307	-.089	.038	.157
(p)	(.403)	(.003)	(.054)	(.583)	(.813)	(.334)

five of the Brim scales, desired interaction, trust, value similarity, assistance and concern, loaded highly on Factor V, which was called General Supportiveness. Finally, Factor VI had high loadings from the predictors, frequency and proximity. Factor VI was titled Reachability.

As noted in Table 8, the Family Enmeshment factor demonstrated a highly significant correlation with both group and individual compliance level. The factor, Size, demonstrated a modest degree of association with compliance as well. None of the other factors shows a significant level of association with compliance.

Finally, the six factors taken together, and Factor 2 and Factor 3 together separately were evaluated in a general linear regression procedure to assess their merit as a more concise model for predicting compliance. The results of these analyses are presented in Table 9. The 2-factor model, with Factor 2 and Factor 3, accounts for 30 percent of the variance for individual compliance and 25.5 percent of the variance on Group.

Relation of Results to Hypotheses

The results of this study were nonsupportive of the hypotheses as they were derived. The results have been presented in a way which facilitates understanding of these discrepancies. Further elaboration of these discrepancies may be found in the following chapter.

TABLE 9
RESULTS OF GENERAL LINEAR

REGRESSION PROCEDURE FOR 2- AND
6-FACTOR MODELS

DEPENDENT VARIABLE = COMP 3

Model	Factors	Sum of Squares	F	Significance Level	R ²
2-Factor	Factor 2	11.37	F(2,37) = 7.91	p ≤ .001	.300
	Factor 3	5.20			
6-Factor	Factor 1	1.02	F(6,33) = 2.99	p ≤ .019	.352
	Factor 2	11.37			
	Factor 3	5.2			
	Factor 4	.44			
	Factor 5	.08			
	Factor 6	1.35			

DEPENDENT VARIABLE = GROUP

2-Factor	Factor 2	1.72	F(2,37) = 6.33	p ≤ .004	.255
	Factor 3	.82			

Continued

TABLE 9 Continued

Model	Factors	Sum of Squares	F	Significance	R ²
6-Factor	Factor 1	.32	F(6,33) = 2.43	p ≤ .047	.306
	Factor 2	1.72			
	Factor 3	.82			
	Factor 4	.17			
	Factor 5	.0002			
	Factor 6	.03			

CHAPTER IV

DISCUSSION

Chapter One reviewed the growing evidence that membership in a supportive network of caring relationships acts as a buffer against the consequences of a variety of life's stresses. The characteristics of a person's social support network have been shown to have important consequences for how well that person adjusts to unemployment, bereavement, major medical illnesses and hospitalization, mental disorders, and a variety of lesser maladies. In this study, the tools and concepts of network analysis have been applied to an investigation of patient compliance to the severe fluid restrictions inherent in a chronic hemodialysis regimen. These restrictions are particularly difficult for dialysis patients as they require strict self-discipline in relinquishing a life long habit. The consequences of failing to adhere to these restrictions are serious, not infrequently resulting in the patient's premature death.

This study was an investigation of the social support network characteristics of two groups of chronic hemodialysis patients, a group that was defined as compliant on a specified measure and a matched group that was defined as noncompliant. Paired t-test and correlation analyses were carried out in a comparison of the data on twenty network variables generated in structured interviews

of the subjects in each group of twenty. Subsequent additional regression and factor analytic techniques were used in search of the most economical network model with which to predict dialysis fluid compliance.

In this chapter, findings from the comparison of individual network characteristics will be reviewed and evaluated with respect to their support for the hypothesized relationship between support and compliance. Following this the predictor intercorrelations, together with the results of the stepwise regression and factor analyses, will be evaluated to determine their ability to present a more concise and coherent model for predicting compliance based on social support network characteristics. The implications of negative results obtained in this study will also be explored. Finally, the chapter will conclude with a discussion of the overall implications of this investigation, including suggestions for further research.

Network Differences for Compliant and Noncompliant Subjects

Several variables were found to be significantly related to dialysis compliance but only two were in the expected direction: size and duration. Compliant subjects had larger and older networks. In addition, density, proximity, staff percent, kin percent, and multiplexity were significantly related to compliance, albeit, in the unexpected direction. Unexpectedly, compliant patients had more dense, less proximate, less multiplex networks made up of fewer dialysis staff and more immediate and extended kin.

The prediction that compliant patients would have less dense, less family dominated networks was based on findings from health care utilization (Salloway & Dillon, 1973) and preventative health behaviour (Langlie, 1977) studies. The less dense, less family oriented networks, associated with "positive" health behaviours in those studies, were presumed to help the patients meet needs for correct health information.

The network configuration related to compliance in the present study, long-standing, tightly knit, and family dominated (on average nearly 70 percent of compliant patients' networks were immediate or extended kin) has been identified in several other studies as best suited for providing optimal emotional support and nurturance (Caplan, 1974) and a strong sense of unchanging identity (Walker et al., 1977).

Based on the findings from this study, it would appear that a dialysis patient's needs, with respect to remaining compliant, are less informational and more a function of having adequate emotional support and a strong sense of his or her identity. Indeed, in the dialysis literature, there is good support for assuming that no relationship exists between information (knowledge about the regimen and its purpose) and compliance (Cummings, 1980). The dialysis literature also lends strong support to the relationship between stable supportive relationships, a strong sense of one's identity and good psychological adjustment to hemodialysis. The findings of this study relative to density and kin percent although not expected, are not surprising, particularly when consideration is given to the very

considerable needs for emotional support on the part of dialysis patients.

The finding that compliant patients had many fewer dialysis staff members in their network than noncompliant patients was also not predicted. The original assumption was that compliant patients would have a greater frequency of relationships with the medical staff whose values they shared concerning the importance of compliance. The fact that the results pointed in the opposite direction is interpreted as consistent with the observations made above. Non-compliant patients, with smaller, less dense, less family dominated networks, networks judged less adequate for meeting emotional support needs, appear to utilize their dialysis unit relationships more heavily presumably to meet their needs for emotional support.

It may well be that a self protective phenomena occurs among personal relationships on a dialysis unit. Indeed, one compliant patient suggested that, for her, not forming close relationships with dialysis staff was a matter of choice. Several close relationships with dialysis staff had ended when those people had taken new jobs (a high rate of staff turnover is not uncommon in dialysis units), and she felt it was no longer worth the effort to get very close to people who would not be around very long. The same reasoning may explain why so few subjects included fellow patients as members of their support network.⁸

⁸ Percentage of fellow patients was not formally studied as a variable in this study. In general, however, few patients listed any of their fellow patients as members of their support network.

The finding that compliant patients had larger networks, as assessed by both measures of size, was predicted, but would appear to be at odds with the interpretation that compliant patient's networks were better suited for providing empathy and emotional support. The network literature generally reports these tightly knit, family dominated networks to be also smaller. The explanation may lie in considering the usage of the adjective "smaller." Studies finding smaller networks to provide better emotional support have usually compared some "stressed" group with a group of "normal" subjects. In the current study the groups compared are equally stressed. The data presented in Chapter One - that normal networks typically contain 6-10 intimately known individuals, and 30 or more regular associates (p. 28) - suggest that the network size of even the compliant group (Size-1, $\bar{x} = 17.85$) in this dialysis sample may well have been "smaller" in relationship to a normal (nondialysis) control group. While it can only be speculated what such a comparison would have shown, it is noteworthy that psychologists and social workers frequently report relatively small networks among dialysis patients.

The network change measure utilized in this study sought information only with respect to recent relationship changes and not in terms of changes that might have occurred with the onset of disability. This is unfortunate since a number of subjects in both groups reported a loss of some important relationships, particularly where their dialysis treatments resulted in a disability leave or absence or retirement from work. Relationships centered around

social drinking were also often lost or greatly changed.

In summary, the findings, with respect to size, suggest that while many of the dialysis patients experienced some decrease in the size of their support systems, the compliant group patients were able to maintain larger networks once they began dialysis. Either they had larger networks to begin with or they were better able to maintain the relationships they had to start with. The fact that compliant patient's networks were larger is not seen as contradicting the earlier statement that these networks provided more emotional support. Indeed it seems far more plausible to argue that in their case, more possible network members provide more potential sources of such support. Table 5, in fact, shows that size -2 was correlated with the measure, support quotient ($r_{xy} = .324, p \leq .04$), a second order predictor variable based on the five Brim support scales.

Two other predictor variables, proximity and multiplexity, also demonstrated significant differences between groups opposite to the original hypotheses. The compliant group networks showed less geographical closeness and a lower percentage of multiplex relationships (considered more supportive). The association between percent and multiplexity ($r_{xy} = -.377, p \leq .017$) may, in part, explain the multiplexity finding. Family members were much more often reported in terms of single role relationships. Although subjects were asked about the different kinds of relationship they had with each network member, they may have been less inclined to consider family relationships as having other dimensions. Thus, the finding of a lower percentage of multiplex relationships may be

embedded in the higher percentage of kin reported by members of the compliant group.

The fact that the compliant group had a less geographically close network is also not consistent with the interpretation that compliant patients have more emotionally support networks. It may be that the noncompliant patient networks, which were smaller and less family dominated, were made up of individuals conveniently closer in the immediate environment such as neighbors and friends. The fact that families are more spread apart geographically in our society would further explain why networks with more family members would also demonstrate a lower degree of proximity. The shrinking of dialysis patients networks, speculated on above, may mean that noncompliant patients more readily let go of their more distant relationships, focusing on relationships more immediate in their environment. This hypothesis requires further exploration in a study that directly assesses network changes after onset of end stage renal disease.

In summary, the comparison of individual network dimensions of compliant and noncompliant patients showed moderate level differences. These differences, moreover, are consistent with the hypothesis that emotional support and empathy play an important role in hemodialysis compliance. The larger size, density, and family percentage of compliant patient networks, parallels findings from other research that demonstrated these characteristics to be associated with maximum provision of emotional support.

A Best Model for Predicting Compliance?

The large number of significant intercorrelations between predictor variables (Table 5) suggested that a search for underlying meaningful network dimensions might be worthwhile. Not surprisingly, the n-variable predictor models, presented in Table 6, show some of the same individual predictors, discussed above, playing a central role: staff percent, size -2, density, proximity, and multiplexity. The notable absence of kin percent and duration from any of the models, suggested that the variance related to these variables had been accounted for by some other variables already present in the model. This was confirmed in the outcome of the factor analysis, which showed kin percent, duration, density, multiplexity, and staff percent to all load heavily on the factor, Family Enmeshment. Of the six factors identified - Reachability, General Supportiveness, Awareness of Medical Status, Change, Size, and Family Enmeshment - the latter two showed significant associations with compliance ($r_{xy}(FE) = .42, p \leq .007$; $r_{xy}(S) = .29, p \leq .07$), together accounting for approximately 30 percent of the variance in individual compliance levels.

The five variables loading highly on Family Enmeshment - staff percent, density, kin percent, duration, and multiplexity - each individually demonstrated modest significant relationships to compliance. Their association in this single factor is interpreted as further confirmation of a positive relationship between compliance and stable enmeshment in a relatively tight family system, a system assumed, on the basis of other literature, to provide for emotional

support and empathy.

The results of the stepwise regression and factor analyses showed that much of the information in the twenty predictor variables is encompassed by five or six underlying general dimensions. It will be important to discover whether this factor structure will be replicated in future network studies. Secondly, these analyses provided substantial support for assuming that two of these broader dimensions, Size, and Family Enmeshment, have significant power for predicting hemodialysis compliance. Finally, the specific variable loadings on the Family Enmeshment factor are consistent with the interpretation that compliance in hemodialysis patients is related to having adequate provisions of emotional support. The implications of these findings for further research and clinical applications will be discussed in a following section of this chapter.

Interpretation of Negative Results

Since the network structural dimensions reveal modest differences, differences which are consistent with the assumption that social support plays an important role in dialysis compliance, it may be asked why there were no comparable differences on any of the Brim scales. These scales (see Appendix E) purport to assess five independent relationship support dimensions. Not only were the intergroup differences nonsignificant, but the scales were highly intercorrelated. Their occurrence as a single General Support factor strongly suggests that these items were tapping a single source of variance in this study.

An explanation of these results may be that the Brim scales are subject to a relatively greater social desirability rating bias among dialysis patients than among many other subject populations. Nearly every psychological study of dialysis patients points out the high level of denial in this population. (Beard, 1969; Czaczkes & DeNour, 1978). Several researchers have noted the problems this presents in using psychological measures with dialysis patients (Strauch-Rahauser et al., 1976; Yanigida & Streltzer, 1979). Yanigida and Streltzer note that, "...due to the high level of denial exercised by dialysis patients, questions designed to satisfy face validity requirements may often induce a negative set in patients who then subsequently deny experiencing the problems that the instrument supposedly measures. This is an especially serious problem for questionnaires... whose content taps psychologically threatening material" (p. 559).

The predictor variables demonstrating significant relationships to compliance in this study were those for which the patient would have no initial set: size, density, and family makeup. They appear to be more "factual." The Brim scales and the awareness, influence, and change items to a less extent, on the other hand, ask very direct evaluative information about that group of people whom the patient is vitally dependent upon. Despite reassurances to the contrary, a number of patients expressed their concern that the information they gave be kept confidential. The Brim scale results, perhaps more than anything else, attest, albeit indirectly, to the critical importance of these support network relationships to the

dialysis patient. As the dialysis literature consistently points out, one of the most central facts of a dialysis patients' existence is their multiple dependencies, dependency on the machines that maintain their lives, on the dialysis staff which run the machines, and finally, on their relationship network for emotional support.

Limitations of the Study and Suggestions for Future Research

The relatively small N utilized in this study, and the modest level of significant differences on the predictor variables, require that these findings be considered suggestive until such times when further information is known about the networks of dialysis patients. There is growing evidence that noncompliance is far from being a unitary phenomenon (Cummings, 1980). The fact that a single type of compliance behaviour was studied obviously requires the greatest caution in extrapolating these findings either to other forms of dialysis compliance or other forms of medical compliance.

The strongly suggested bias present in the Brim scales toward generating socially desirable responses was a major drawback to obtaining information about relationship content.

The difficulty obtaining psychologically "sensitive" information using a structured interview with members of the hemodialysis population will undoubtedly challenge future researchers as well. One possibility might be to convene a meeting of patients' support networks for an "information gathering" joint session during which, direct observational data could be gathered which bears on network style of functioning (who talks to whom, what is the energy level in the network, which people typically handle which content issues).

An easier solution might be to construct an instrument that asks the subject to report on the content of their network relationships in a less obvious fashion. This might be accomplished using a projective approach in which a subject is asked to draw a picture of their "real" and "ideal" networks and then discuss the differences between these two figures during a semi-structured interview.

Recent network studies have begun to focus on the interaction between network variables and individual characteristics of the focal individuals, e.g., their particular need structure and their orientation toward using their network (Tolsdorf, 1975, 1976). No attempt was made to study these individual variables in the current study. It may be that, for most dialysis patients, emotional support, empathy, and a sense of one's identity, are the most salient needs. However, for other patients, tangible needs for assistance in the form of shelter, transportation, and supplemental income may be far more pressing. Although information about how particular network configurations best serve specific needs is just beginning to become available, it seems reasonable to assume that more than one network configuration will demonstrate beneficial effects for dialysis patients. A more complete study would attempt to assess the specific needs hierarchy and network orientation of individuals together with their network structure. Successful adjustment to any specific stressor would most likely be best predicted by some combination of these factors. Indeed the burgeoning literature on person-environment fit has already begun to study these relationships in a more general way.

This study would have been more informative had two control groups been studied in conjunction with the dialysis groups. A comparison group of acutely ill medical patients would have yielded important facts concerning the role and importance of social support network variables for adjusting to chronic versus acute medical crises. A group of normal subjects would have provided hard information about how dialysis patient networks differ as a group from those of the general population.

Finally, the question of dialysis patient network "shrinkage" could only be presumed based on several patients' comments during the interview procedure. In future studies it would be worthwhile to inquire specifically about relationships which were lost or greatly altered at the onset of the patient's end stage renal disease. Even more desirable, although requiring a longer time commitment, would be the longitudinal study of dialysis patients networks from the time end stage renal disease is diagnosed. This could provide critical information about how network characteristics, patient needs, and patient overall adjustment (including compliance) vary across time and whether changes in these different areas appear to be related to each other.

Summary and Implications

The findings of this study must be considered tentative. A relatively small N was used and group differences on the predictor variables, while relevant and theoretically interesting, are modest. However, the relationships obtained between predictor variables and

individual compliance are quite consistent with the thesis that emotional support, mediated by a somewhat larger, dense, kin-oriented network configuration, plays an important role in hemodialysis compliance.

It is noteworthy that the network mapping approach used in this study yielded significant findings regarding the relationship between social support and compliance, albeit indirectly. Direct attempts to inquire about the support dimensions of the subject's network relationships using the five Brim scales, failed to confirm the differences in amount of support, suggested by the network structural differences in size, density, and composition. It is a significant benefit of the network mapping technique that it allows a researcher to evaluate important social processes, such as provision of emotional support to a chronically ill patient, without necessarily asking the subject to make revealing, evaluative judgements about these critical relationships.

It is clear that much more needs to be known about the relationships between particular network configurations and the provision of various kinds of support. Particularly, the role of dense, family oriented networks in providing emotional support needs to be explored further.

These findings, tentative as they are, already suggest possible ways of intervening with hemodialysis patients to increase the likelihood of their remaining compliant to their medical restrictions. One suggestion is that the social work staff, present on dialysis units, include in their initial assessment of new dialysis patients a survey

of the patient's social support network dimensions.. Where the network configuration suggests a possible lack of emotional support for the patient, attempts should be made to strengthen network relationships or extend them by encouraging the patient to look outside his existing network for new sources of support, e.g., participation in local kidney foundation activities. With patients, identified on the basis of the network survey, as potential noncompliers, increased efforts can be made towards involving the patient's family and friends in the patient's dialysis treatment. Regular weekly, semi-structured, multiple family groups run by social work staff and providing information and an occasion for socializing with some of the unit staff, would be one means of involving network members. Once a patient has fallen into a serious pattern of regular noncompliance, the patient's social network should be convened and given a share of the responsibility in helping the patient to achieve better compliance.

APPENDIX A
VALUES FOR DEMOGRAPHIC AND
MEDICAL HISTORY VARIABLES BY PAIR

Appendix A

Pair	Group	Age	Sex	Marital Status	Race	Educa.	Income	Employ.	Dialysis Time	Output
1	None	48	M	S	C	15	L**	P-T	7	0
	Comp	53	M	W	C	12	6	F-T	5	1
2	None	59	F	M	B	10	2	Un.	2	0
	Comp	68	F	M	B	11	3	Un.	5	0
3	None	56	M	M	C	12	3	Ret.	2	0
	Comp	56	M	M	C	10	6	P-T	4	2
4	None	61	M	M	B	7	1	Ret.	4	0
	Comp	67	M	M	B	6	3	Ret.	6	1
5	None	32	M	S	B	12	2	Ret.	2	0
	Comp	37	M	M	B	14	2	F-T	4	.25
6	None	52	M	Wid.	C	13	1	Ret.	6	0
	Comp	57	M	M	C	12	6	F-T	4	1
7	None	31	F	S	B	15	6	P-T	7	0
	Comp	33	F	Sep.	B	12	2	Un.	2	2
8	None	48	M	M	B	13	6	P-T	6	0
	Comp	56	M	M	B	13	4	P-T	5	0
9	None	54	M	M	B	6	2	Ret.	6	0
	Comp	55	M	M	B	5	2	Ret.	4	1.5

Continued

Appendix A Continued

Pair	Group	Age	Sex	Marital Status	Pace	Educa.	Income	Employ.	Dialysis Time	Output
10	None	56	F	Wid.	B	6	2	Un.	3	1
	Comp	53	F	M	B	10	2	Un.	4	0
11	None	31	F	S	B	9	1	Un.	7	0
	Comp	34	F	Div.	B	12	2	Un.	3	0
12	None	38	M	Div.	B	13	1	Un.	5	0
	Comp	25	M	Sep.	B	12	1	Un.	1	1
13	None	35	M	M	C	14	5	F-F	2	1
	Comp	36	M	Div.	C	12	2	F-F	2	1
14	None	51	F	M	B	9	1	Un.	1	0
	Comp	62	F	M	B	12	2	Un.	1	.5
15	None	75	M	M	B	6	3	Ret.	3	3
	Comp	73	M	M	B	9	1	Ret.	3	0
16	None	52	M	M	B	9	3	Ret.	2	0
	Comp	52	M	M	B	11	4	Ret.	1	1
17	None	50	F	M	B	12	1	Un.	4	0
	Comp	53	F	M	B	11	1	Un.	4	0
18	None	36	F	S	C	12	2	Un.	4	0
	Comp	39	F	S	C	13	2	Un.	5	0

Continued

Appendix A Continued

Pair	Group	Age	Sex	Marital Status	Race	Educa.	Income	Employ.	Dialysis Time	Output
19	None	23	F	S	B	12	1	Un.	3	0
	Comp	38	F	M	B	11	3	Un.	7	0
20	None	49	M	M	C	16	6	Ret.	1	0
	Comp	45	M	N	C	13	5	Un.	7	0

* measured in cups/day.

** The ordinal scoring of income is as follows: 1 = 0 - 4999; 2 = 5000 - 9999; 3 = 10,000 - 14,999; 4 = 15,000 - 19,999; 5 = 20,000 - 24,999; 6 = 725,000.

APPENDIX B
PATIENT CONSENT FORM

APPENDIX B
CONSENT FORM

96

You are invited to participate in a study that, hopefully, will extend our knowledge of how social and psychological factors influence a dialysis patient's ability to cope with their treatment and its dietary and fluid restrictions. This information will help us to better know how to psychologically assist patients so that they may benefit to the greatest degree from their dialysis.

I am interested in knowing about the circle of family, friends and others you have around you. You will be asked to identify these people (by initials only) and to answer some questions about these important relationships, such as How long have you known this person? and, How often do you currently see or hear from them? All information you provide will be indexed by your subject code number to assure confidentiality.

If you agree to participate in this study, you will be interviewed by myself during your regular dialysis treatment, and at your convenience. Total interview time will be approximately 3 hours, but this will be spread over several dialysis treatments, so that no session will be so long as to cause you to tire. You will have the right to terminate our interview at any time, for any reason, or to withdraw from the study entirely without any prejudice to you whatsoever. At any time you are encouraged to ask myself or anyone else any questions about any concerns you have regarding this study.

Your dialysis treatment will be carried out exactly as it usually is, with regular periodic monitoring of your status by dialysis staff. Should you have any difficulties, or begin to tire, interviewing will be stopped immediately.

In signing below you acknowledge that Mr. Peter Burgher has discussed this study with you and has agreed to answer your questions regarding this study. You also will be accepting the fact that there exists no federal, state or private program that will provide you compensation for any physical injuries resulting from participation in this research.

Thank you very much for your consideration regarding participation in this study.

Peter L. Burgher, M.A.
Nathan Levin, M.D.

I _____ have read the above and agree to
SIGNATURE OF VOLUNTEER participate in this study.

DATE _____
SIGNATURE OF WITNESS PRESENT FOR
EXPLANATION OF THIS STUDY TO THE
PATIENT.

SIGNATURE OF INVESTIGATOR

APPENDIX C
OPERATIONAL DEFINITIONS OF CRITERIA FOR
SOCIAL NETWORK MEMBERSHIP
(ORDERED BY DEGREE OF INCLUSIVENESS)*

*Mitchell & Trickett (1980)

APPENDIX C.

OPERATIONAL DEFINITIONS OF CRITERIA FOR SOCIAL NETWORK MEMBERSHIP

(ORDERED BY DEGREE OF INCLUSIVENESS)

-
- Tolsdorf (1976) "The individual question and the focal person must know each other by name, they must have an ongoing personal relationship, and they must have some contact at least once a year." (p. 408)
- Cohen & Sokolovsky (1978)
Sokolovsky, Cohen, Berger,
& Geiger (1978) "All links within the preceding year with a frequency of at least one a month." (Excluding relationships developed solely within the context of a formal or institutional relationship, e.g., patient to doctor). (p. 549).
- Henderson (1978) "We define the primary group as being made up of all kin, nominated friends, work associates, and neighbors." (p. 77)
- Llamas (1976)
Pattison, DeFrancisco,
Wood, & Crowder (1975) "Name all the people over groups who are important in your life at this moment, whether you like them or not."
- Brim (1974) "Respondents were asked to list the initials of all adults whom they saw at least once a month and whom they considered to be important in their lives." (p. 435)
- Tolsdorf (1978) Respondents were "asked to name those people whom they felt close to and whom they knew well." (p. 9)
- Horwitz (1977) "We use the kinship and friendship networks to measure the informal social network.... We measure the strength of the kin network, by summing the total number of monthly contacts each patient has with any other kin member.... We measure the friendship network by the number of separate friends in the network." (p. 91)
- Hirsch (1979)
Hirsch (1978) "Respondents--list in matrix form up to 15 significant others with whom they were likely to interact at least once during any 2 week period." (p. 8)

Continued

APPENDIX C Continued

-
- Craven & Wellman (1973)
Shulman (1975)
Shulman (1976)
Wellman (1978)
- "Respondent is asked to name the people outside his or her household that he or she feels closest to (up to a maximum of six)."
- Holohan, Betak, Spearly, &
Chance (1979)
- Respondent is asked "Who do you get in touch with if you want to go out and have fun, or if you just want to go out visiting?" (This is used as a measure of social friendships, rather than as a measure of the social network, per se.)
- Kasarda & Janowitz (1974)
- Respondent is asked "How many people would you say you know who live...(respondent's home area)? How many adult friends would you say you have who live within 10 minutes walk of your house? How many adult relatives and in-laws do you have who live within 10 minutes walk of your home?" (Measure of social social bonds or networks.)
- SW*

APPENDIX D
NETWORK RELATIONSHIP QUESTIONNAIRE

APPENDIX D

Patient Code Number: _____

Network Member: _____

1. What is your relationship to this person? (Where and when do you typically see each other? Doing what?) (Are there other ways, times or places you interact with this person?)
1. immediate family (children, spouse, parents, siblings)
 2. extended family (uncles, aunts, cousins, in-laws, grandparents)
 3. close friend (confidant, intimate acquaintance)
 4. secondary friend (acquaintance, casual friend, social connection)
 5. economic (professional acquaintance, co-worker, boss, employee, someone known through a business arrangement)
 6. medical (relationship formed through medical treatment)
 7. recreational (relationship to achieve recreational ends, eg. sports, other leisure time activities)
 8. religious (relationships centered on some form of religious activity)
 9. political (relationship centered on some form of political activity)
 10. sexual
 11. fraternal (membership in social or community organization)
 12. mutual aid (relationships based on doing something together for mutual aid, eg. weight watchers, AA)
 13. service (relationship based on common daily needs, eg. mailman, shopkeeper, paper boy)
 14. education (school related relationship, eg. student, teacher, principal)
 15. other (specify) _____

Interviewer's comments: _____

2. How long have you known this person?

Answer _____

- | | |
|----------------------|-----------------------|
| 1. one month or less | 4. ten years |
| 2. six months | 5. more than 10 years |
| 3. five years | |

3. How often do you have contact with this person by phone, letter, or in person:

Answer _____

- | | |
|-----------------------|------------------------|
| 1. daily | 4. at least once/month |
| 2. several times/week | 5. at least once/year |
| 3. at least once/week | |

4. What distance does this person live from you? (Where does this person live?)

Answer _____

- | | |
|---------------------------------------|-----------------------------|
| 1. same building | 4. full day's drive or less |
| 2. walking distance/same neighborhood | 5. more than 1 day drive |
| 3. same city (1 hour drive or less) | |

5. Please give the following information about this person to the best of your knowledge.

Match

- yes/no sex _____
- yes/no age _____ (30, 5 years; over 30, 10 years)
- yes/no race/ethnic _____
- yes/no level of education _____ (grammar school, high school, under-graduate, graduate)
- yes/no income level _____ (within \$5000)
- yes/no political beliefs _____ (conservative, moderate, liberal)
- yes/no religious beliefs _____ (protestant, catholic, jewish, agnostic)
- yes/no medical situation _____ (any chronic illness)
- yes/no neighborhood _____

Please indicate how strongly you agree or disagree with the following statements describing this person's relationship with you.

	5	4	3	2	1
	Strongly				Strongly
	<u>Agree</u>	<u>Agree</u>	<u>Undecided</u>	<u>Disagree</u>	<u>Disagree</u>
6. He or she would enjoy seeing me every day.	_____	_____	_____	_____	_____
7. He or she would ask me to risk personal danger to help them out of a tight spot.	_____	_____	_____	_____	_____

	5	4	3	2	1
	<u>Strongly</u> <u>Agree</u>	<u>Agree</u>	<u>Undecided</u>	<u>Disagree</u>	<u>Strongly</u> <u>Disagree</u>
8. He or she would discuss with me some psychological problem he or she was having.	_____	_____	_____	_____	_____
Please indicate how strongly you agree or disagree with the following statements about your relationship with this person.					
	5	4	3	2	1
	<u>Strongly</u> <u>Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly</u> <u>Disagree</u>
9. I would enjoy seeing him or her every day.	_____	_____	_____	_____	_____
	(desired interaction)				
10. I would ask him or her for a loan of sizeable amount of money if I were in serious need and he or she had it to spare.	_____	_____	_____	_____	_____
	(assistance)				
11. I generally share the same philosophy of life with him or her, although we often disagree on specifics.	_____	_____	_____	_____	_____
	(value similarity)				
12. I try to always remember his or her birthday.	_____	_____	_____	_____	_____
	(concern)				
13. I would trust him or her with information that could get me fired.	_____	_____	_____	_____	_____
	(trust)				
14. I would spend most of my free time with him or her if possible.	_____	_____	_____	_____	_____
	(desired interaction)				
15. I would ask him or her to risk personal danger to help me out of a tight spot.	_____	_____	_____	_____	_____
	(assistance)				
16. I would feel that his or her ideals most nearly approach my ideals of the right way.	_____	_____	_____	_____	_____
	(value similarity)				
17. I would discuss with him or her some psychological problems I was having if I needed to talk about them with somebody.	_____	_____	_____	_____	_____
	(trust)				
18. I would like to see him or her more often.	_____	_____	_____	_____	_____
	(desired interaction)				
19. I feel that I have a great many interests in common with him.	_____	_____	_____	_____	_____
	(value similarity)				
20. I would ask him or her to pick me up at the airport late at night if there were no other means of transportation available.	_____	_____	_____	_____	_____
	(assistance)				
21. I would tell him or her about a "put down" somebody had given me if I needed to talk about it with somebody.	_____	_____	_____	_____	_____
	(trust)				
22. To what extent is this person aware of your medical situation and dialysis treatments?					
1. He or she is totally unaware.					
2. He or she knows about my dialysis but we don't discuss it.					
3. I talk about some aspects of my illness and treatment with him or her.					
4. I discuss most aspects of my illness with him or her.					
5. I discuss all aspects of dialysis with him or her.					
23. To what extent is this person aware of the limitations dialysis places on you in terms of diet, fluid intake and need for medications?					
1. He or she is totally unaware.					
2. Aware of a few of the limitations.					
3. Aware of some of the limitations.					
4. Aware of all the limitations.					

24. How often has this person attempted to influence you toward greater or lesser compliance to your dialysis restrictions?

Often attempts to influence me negatively

Occasionally in a - direction

Does not try to influence me

Occasionally in a + direction

Often attempts to influence me in a positive direction

25. Has your relationship with this person changed since you have been on dialysis? How? positive or negative?

Much worse

Somewhat worse

Not at all changed

Somewhat better

Much better

APPENDIX E
FACTOR LOADINGS OF THE 13 SOCIAL
RELATIONSHIP ITEMS USED IN THE BRIM (1974)
STUDY

APPENDIX E

Factor Loadings of the 13 Social Relationship Items Used in the Seattle Study (Items are listed in the order in which they appeared on the questionnaire. The highest loading of each item is underlined).

Item No.	Brief Description of Item Content	Factor on Which Item was Highly Loaded in the Student Study	Factor I (Desired Interaction)	Factor II (Assistance)	Factor III (Trust)	Factor IV (Value Similarity)	Factor V (Concern)
21	Enjoy seeing every day	Desired interaction	<u>.83</u>	.15	.03	.25	.13
2	Ask for loan	Assistance	.24	<u>.71</u>	.07	.06	<u>.39</u>
9	Share same philosophy of life	Value similarity	.26	.10	.16	<u>.84</u>	.07
16	Try to remember birthday	Concern	.13	.15	<u>.10</u>	.08	<u>.90</u>
15	Trust with information that could get me fired	Trust	.03	.31	<u>.60</u>	.25	.24
22	Would spend free time with	Desired interaction	<u>.70</u>	.30	.21	.20	.25
5	Ask to risk danger to help me.	Assistance	.14	<u>.84</u>	.24	.11	-.13
7	Have similar ideals	Value similarity	.16	.06	.21	<u>.87</u>	.04

Continued

APPENDIX E CONTINUED

Item No.	Brief Description of Item Content	Factor on Which Item was Highly Loaded in the Student Study	Factor I (Desired Interaction)	Factor II (Assistance)	Factor III (Trust)	Factor IV (Value Similarity)	Factor V (Concern)
19	Discuss psycho-logical problems with	Trust	.24	.12	<u>.80</u>	.31	.02
23	Like to see more often	Desired interac-tion	<u>.73</u>	.10	.30	.21	-.02
8	Many interests in common	Value similarity	.35	.09	.29	<u>.71</u>	.05
6	Ask to pick up at airport	Assistance	.16	<u>.62</u>	.26	.07	.40
17	Tell about a "put down"	Trust	.25	.18	<u>.81</u>	.16	.09

APPENDIX F

PEARSON CORRELATION COEFFICIENTS FOR NETWORK VARIABLES WITH EACH OTHER

	Size 1	Size 2	Density	Multiplexity	Kin Percent
Size 1	1.000				
Size 2	.929***	1.000			
Density	-.248	-.142	1.000		
Multiplexity	-.108	-.094	-.365*	1.000	
Kin Percent	.077	.175	.658***	-.377*	1.000
Duration	.053	.180	.516***	-.297	.546***
Frequency	-.173	-.155	.024	.281	-.060
Proximity	-.288	-.309	.058	.079	-.076
Homogeneity	.050	.186	-.111	.102	-.128
Reciprocity	-.402**	-.376*	.056	.027	-.067
Desired Interaction	-.069	.115	.347	-.142	.442**
Assistance	.071	.257	.254	-.038	.457**
Trust	.129	.341*	.054	.100	.316*
Value Similarity	.188	.326*	.234	-.137	.395*
Concern	.079	.245	.326*	-.079	.311
Dialysis Aware	.115	.141	.058	-.134	.127
Compliance Aware	.173	.198	-.005	-.156	.128
Influence	.417**	.441**	.027	-.091	.069
Change	-.163	-.155	-.069	.002	-.126
Intensity	.064	.273	.321*	.012	.433**
Support Quotient	.103	.324*	.300	.054	.490**

APPENDIX F CONTINUED

	Duration	Frequency	Proximity	Homogeneity	Reciprocity
Duration	1.000				
Frequency	-.042	1.000			
Proximity	-.125	.440**	1.000		
Homogeneity	.097	.202	.108	1.000	
Reciprocity	-.058	-.244	.183	-.340*	1.000
Desired Interaction	.389*	.187	.044	.479**	-.155
Assistance	.317*	.175	-.051	.207	-.273
Trust	.207	.025	-.113	.356*	-.250
Value Similarity	.230	.082	-.246	.312*	-.403**
Concern	.384*	.204	-.046	.325*	-.055
Dialysis Aware	.100	-.107	-.225	.063	-.305
Compliance Aware	.124	-.054	-.251	.154	-.349*
Influence	.033	.277	-.037	.227	-.330*
Charge	.071	.063	.033	.235	.224
Intensity	.388*	.371*	.031	.461**	-.345*
Support Quotient	.372*	.167	.114	.414**	-.303

Continued

APPENDIX F CONTINUED

	Desired Interaction	Assistance	Trust	Value Similarity	Concern	Dialysis Awareness
Desired Interaction	1.000					
Assistance	.497***	1.000				
Trust	.697****	.561***	1.000			
Value Similarity	.668****	.529***	.617****	1.000		
Concern	.721****	.222	.561***	.507***	1.000	
Dialysis Awareness	.322*	.048	.483**	.310	.363*	1.000
Compliance Awareness	.364*	.099	.504***	.310	.340*	.926****
Influence	.489**	.222	.463***	.510***	.432**	.304
Change	.196	-.229	.123	-.031	.168	.110
Intensity	.841****	.658****	.798****	.718****	.749****	.385*
Support Quotient	.870****	.727****	.865****	.838****	.688****	.384*

Continued

APPENDIX F CONTINUED

	Compliance Awareness	Influence	Change	Intensity	Support Quotient
Compliance Awareness	1.000				
Influence	.361*	1.000			
Change	.238	.067	1.000		
Intensity	.414**	.515***	.342	1.000	
Support Quotient	.408**	.520***	.032	.937***	1.000

* p .05

** p .01

*** p .001

**** p .0001

APPENDIX G

BEST 1-, 2-, 3-, 4-, 5-, AND 6-VARIABLE

MODELS FOR PREDICTION OF GROUP

Model	Variables	B Values	F	Significance Level	R ²
One Variable	Staff Percent	-2.838	F(1,38) = 6.14	p .018	.139
Two Variable	Proximity Staff Percent	-.354 -3.103	F(2,37) = 5.46	p .008	.228
Three Variable	Size 2 Change Staff Percent	.022 .450 -2.915	F(3,36) = 4.64	p .008	.279
Four Variance	Size 2 Proximity Change Staff Percent	.018 -.269 .446 -3.11	F(4,35) = 4.22	p .007	.325
Five Variable	Size 2 Density Proximity Change Staff Percent	.020 .544 .260 .476 -2.45	F(5,34) = 3.83	p .007	.360

Continued

APPENDIX G Continued

Model	Variables	B Values	F	Significance Level	R ²
Six Variable			F(6,33) = 3.37	p .011	.380
	Size 2	.016			
	Density	.564			
	Proximity	-.245			
	Reciprocity	-.085			
	Change	.527			
	Staff Percent	-2.371			

APPENDIX H

PEARSON CORRELATION COEFFICIENTS
FOR DEMOGRAPHIC VARIABLES WITH NETWORK
VARIABLES

Network Variables	Demographic Variables				
	Age	Sex	Race	Education	Income
Size -1	.043	.149	-.156	.007	.065
Size -2	-.078	.152	-.076	.146	.122
Density	.228	-.065	-.160	-.073	.010
Multiplexity	-.396*	.049	.017	.204	.133
Kin percent	.207	-.136	.007	-.010	.232
Duration	.217	-.096	.061	.114	.168
Frequency	-.076	.176	-.485**	-.348*	-.374*
Proximity	.000	.182	.085	-.176	-.064
Homogeneity	-.271	.256	-.071	.260	-.037
Reciprocity	-.193	-.097	.237	.174	.229
Desired Interaction	-.061	.305	-.107	.126	.225
Assistance	.019	-.257	.077	-.017	.238
Trust	-.297	.238	.072	.382*	.314*
Value Similarity	-.122	.145	-.156	.075	.232
Concern	-.182	.568****	-.318*	.167	-.047

Continued

APPENDIX H CONTINUED

Network Variables	Demographic Variables				
	Age	Sex	Race	Education	Income
Dialysis Awareness	-.022	.418**	-.103	.089	-.039
Compliance Awareness	-.004	.373*	-.081	.118	-.004
Influence	-.163	.379*	-.334*	-.149	-.171
Change	-.272	.103	.004	.343*	.048
Intensity	-.159	.341*	-.171	.116	.125
Support Quotient	-.165	.200	-.086	.187	.259

* p .05
 ** p .01
 *** p .001
 **** p .0001

REFERENCES

- Abram, H. S., Moore, G. L., & Westervelt, F. B. Suicidal behaviour in chronic hemodialysis patients. American Journal of Psychiatry, 1971, 127 (9), 1199-1204.
- Alexander, L. The double-bind theory and hemodialysis. Archives of General Psychiatry, 1976, 33 (11), 1353-1356.
- Barnes, J. A. Class and committees in a Norwegian island parish. Human Relations, 1954, 7 (1), 39.
- Barnes, J. A. Social networks: Modular Publications in Anthropology. Reading, Massachusetts: Addison-Wesley, 1972.
- Barofsky, I. Compliance, adherence and the therapeutic alliance: Steps in the development of self care. Social Science and Medicine, 1978, 12, 369-376.
- Beard, B. H. Fear of death and fear of life: The dilemma in chronic renal failure, hemodialysis, and kidney transplantation. Archives of General Psychiatry, 1969, 21 (3), 373-380.
- Becker, M. H. Sociobehavioural determinants of compliance. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care. Baltimore: Johns Hopkins Press, 1976.
- Becker, M. H., Drachman, R. H., and Kirscht, J. P. Predicting mothers' compliance with pediatric medical regimens. Journal of Pediatrics, 1972, 81 (4), 843-854.

- Becker, M. H., & Maiman, L. A. Sociobehavioural determinants of compliance with health and medical care recommendations. Medical Care, 1975, 13, 10-24.
- Ben-Sira, Z. Affective and instrumental components in the physician-patient relationship: An additional dimension of interaction theory. Journal of Health and Social Behaviour, 1980, 21, 179-180.
- Berger, M., & Wuescher, I. The family in the substantive environment: an approach to the development of transactional methodology. Journal of Community Psychology, 1975, 3 (3), 246.
- Berkow, R. (Ed.) The Merck manual of diagnosis and therapy. Rahway, New Jersey: Merck, Sharp & Dohme Research Laboratories, 1977.
- Blackburn, S. L. Dietary compliance of chronic hemodialysis patients. Journal of the American Dietetic Association, 1977, 70, 31-37.
- Blackwell, B. Patient compliance. New England Journal of Medicine, 1973, 289, 249.
- Blau, P. M. Exchange and power in social life. New York: Wiley, 1964.
- Bloom, J. W., & Wilson, R. N. Patient-practitioner relationships. In H. E. Freeman, S. Levine, & L. G. Reeder (Eds.), Handbook of Medical Sociology. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.
- Boissevain, J., & Mitchell, J. E. (Eds.) Network analysis: Studies in human interaction. The Hague, Mouton, 1973.
- Borkman, T. S. Hemodialysis compliance: The relationship of staff estimates of patients' intelligence and understanding to compliance. Social Science and Medicine, 1976, 10, (7-8), 385-392.

- Bott, E. Family and social network. 1st Ed. London: Tavistock Publications, 1957.
- Bott, E. Family and social network. 2nd Ed. London: Tavistock Publications, 1971.
- Brehm, J. W. A theory of psychological reactance. New York: Academic Press, 1966.
- Brim, J. A. Social network correlates of avowed happiness. Journal of Nervous and Mental Disorders, 1974, 158, 432-439.
- Caldwell, J. R., Cobb, S., Dowling, M. O., & Dejongh, D. The dropout problem in antihypertensive treatment: A pilot study of social and emotional factors influencing a patient's ability to follow anti-hypertensive treatment. Journal of Chronic Diseases, 1970, 22, 579-592.
- Campbell, D. T. Factors relevant to the validity of experiments in social settings. Psychological Bulletin, 1957, 54 (4), 297-312.
- Campbell, D. T., & Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally College Publishing Co., 1963.
- Caplan, G. Support systems and community mental health: Lectures on concept development. New York: Behavioral Sciences Publications, 1974.
- Caplan, R., Robinson, E., French, J., Caldwell, J., & Skirr, M. Adhering to medical regimens: Pilot experiments on patient education and social support. Ann Arbor: Institute for Social Research, 1976.

- Cassel, J. The contribution of the social environment to host resistance. American Journal of Epidemiology, 1976, 104, 107-123.
- Cobb, S. Social support as a moderator of life stress. Psychosomatic Medicine, 1976, 38 (5), 300-314.
- Coleman, J. S., Katz, E., & Menzel, H. Medical innovation. Indianapolis: Bobbs & Merrill, 1966.
- Craven, P., & Wellman, B. The network city. Sociological Inquiry, 1973, 43, 57.
- Cummings, J. W. Hemodialysis - feelings, facts and fantasies. The pressures and how patients respond. American Journal of Nursing, 1970, 70, 70.
- Cummings, K. M. Understanding and influencing compliance with regimen by ambulatory hemodialysis patients. (Doctoral dissertation, University of Michigan, 1980). Dissertation Abstracts International, 1981, 41 (2), 510B. (University Microfilms No. 8017235).
- Cummings, K., Jette, A., Brock, B., & Haefner, D. Psychosocial determinants of immunization behaviour in a swine influenza campaign. Medical Care, 1979, 17, 639.
- Czaczkes, J. W., & DeNour, A. K. Chronic hemodialysis as a way of life. New York: Bruner-Mazel, 1978, p. 123.
- Davis, M. S. Variations in patients compliance with doctor's advice: an empirical analysis of patterns of communications. American Journal of Public Health, 1968, 58 (2), 274-288.
- Dean, A., & Lin, N. The stress buffering role of social support. The Journal of Nervous and Mental Disease, 1977, 165, 403-417.

- DeNour, A. K., & Czaczkes, J. W. Emotional problems and reactions of the medical team in a chronic hemodialysis unit. Lancet, 1968, 2, 987.
- DeNour, A. K., & Czaczkes, J. W. Personality factors in chronic hemodialysis patients causing noncompliance with medical regimen. Psychosomatic Medicine, 1972, 34 (4), 333-344.
- DeNour, A. K., & Czaczkes, J. W. Adjustment to chronic dialysis. Israeli Journal of Medical Science, 1974, 10 (5), 498-503. (a)
- DeNour, A. K., & Czaczkes, J. W. Bias in assessment of patients on chronic dialysis. Journal of Psychosomatic Research, 1974, 18 (3), 217-221. (b)
- DeNour, A. K., & Czaczkes, J. W. The influence of patients personality on adjustment to chronic dialysis: A predictive study. Journal of Nervous and Mental Disorders, 1976, 162 (5), 323-333.
- DeNour, A. K., & Czaczkes, J. W. Nurses' rejection and acceptance of patients: A study of a chronic hemodialysis unit. Mental Health Society, 1978, 4 (1-2), 85-94.
- DeNour, A. K., Czaczkes, J. W., & Lilos, P. A study of chronic hemodialysis teams - Differences in opinions and expectations. Journal of Chronic Diseases, 1972, 25, 441-448.
- DiMatteo, M. R. A Social-Psychological Analysis of Physician-Patient Rapport: Toward a Science of the Art of Medicine. Journal of Social Issues, 1979, 35 (1).

- Dohrenwend, B. S., & Dohrenwend, B. P. Stressful life events: their nature and effects. John Wiley & Sons, New York, 1974.
- Donabedian, A., & Rosenfeld, L. Follow-up study of chronically ill patients discharged from hospital. Journal of Chronic Diseases, 1964, 17, 847-862.
- Erikson, G. D. The concept of personal network in clinical practice. Family Process, 1975, 14 (4), 487-498.
- Finlayson, A. Social networks as coping resources: Lay help and consultation patterns used by women in husband's post-infarction career. Social Science in Medicine, 1976, 10, 97-103.
- Foster, F. G., Cohen, G. L., & McKegney, F. P. Psychobiologic factors and individual survival on chronic renal hemodialysis: A two year follow-up. Psychosomatic Medicine, 1973, 35 (1), 64-82.
- Foster, F. G., & McKegney, F. P. Small group dynamics and survival on chronic hemodialysis. International Journal of Psychiatry in Medicine, 1977-78, 8 (2), 105-116.
- Francis, V., Korsch, B. M., & Morris, M. J. Gaps in doctor-patient communications. New England Journal of Medicine, 1969, 280 (10), 535.
- Freeman, B., Negrate, V., Davis, M., Korsch, B. Gaps in doctor-patient communications: Doctor-patient interaction analysis. Pediatric Research, 1971, 5, 298-311.
- Freidson, E. Patients views of medical practice. New York: Russell Sage Foundation, 1960.

- Freyberger, H. Six years experience as a psychosomataticist in a hemodialysis unit. Psychotherapy and Psychosomatics, 1973, 22 (2-6), 226-232.
- Friedman, E. A., Goodwin, N. J., & Chaudhry, L. Psychosocial adjustment to maintenance hemodialysis. New York State Journal of Medicine, 1970, 70 (5), 629-637, 767-774.
- Friedman, H. S. Nonverbal Communication Between Patients and Medical Practitioners. Journal of Social Issues, 1979, 35 (1).
- Geertsen, R., Klauber, M. R., Rindflesh, M., Lane, R. L., & Grey, R. A re-examination of Suchman's views on social factors in health care utilization. Journal of Health and Social Behaviour, 1975, 16, 226-237.
- Goldstein, A. M., & Reznikoff, M. Suicide in chronic hemodialysis patients from an external locus of control framework. American Journal of Psychiatry, 1971, 127 (9), 1204-1207.
- Gordis, Leon. Methodological issues in the measurement of patient compliance. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care. Baltimore: Johns Hopkins Press, 1976.
- Gore, S. The effects of social support in moderating the health consequences of unemployment. Journal of Health and Social Behaviour, 1978, 19, 157-165.
- Granovetter, M. S. The strength of weak ties. American Journal of Sociology, 1973, 78, 1360.
- Green, L. W. Status identity and preventative health behaviour. Public Health Education Reports, 1970, (1), 130.

- Gutch, C. F., & Stoner, M. H. Review of hemodialysis for nurses and dialysis personnel (2nd Ed.), St. Louis: C. V. Mosby Co., 1975.
- Haggerty, R., & Roghmann, K. Noncompliance and self-medication: Two neglected aspects of pediatric pharmacology. Pediatric Clinics of North America, 1972, 19, 101-115.
- Hammer, M. Influence of small social networks as factors on mental hospital admission. Human Organization, 1963-4, 22, 243-251.
- Hammer, M., Makiesky-Barrow, S., Gutwirth, L. Social networks and schizophrenia. Schizophrenia Bulletin; 1978, 4 (4), 546-560.
- Hartman, P. E., & Becker, M. H. Noncompliance with prescribed regimen among chronic hemodialysis patients: A method of prediction and educational diagnosis. Dialysis and Transplantation, 1978, 7 (10) 978-989.
- Hawk, A. B., Carpenter, W. T., Strauss, J. S. Diagnostic criteria and five year outcome in schizophrenia. Archives of General Psychiatry, 1975, 32, 343-347.
- Hayes-Bautista, D. Modifying the treatment: Patient compliance, patient control and medical care. Social Sciences and Medicine, 1976, 10, 233-238.
- Haynes, R. B. A critical review of the determinants of patient compliance with therapeutic regimens. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care, Baltimore: Johns Hopkins University Press, 1979.

- Haynes, R. B., Taylor, D. W., & Sackett, D. L. Compliance in health care. Baltimore, Maryland: The Johns Hopkins University Press, 1979.
- Henderson, S. The social network, support, and neurosis: The function of attachment in adult life. British Journal of Psychiatry, 1977, 131, 185-191.
- Henderson, S., & Byrne, D. Towards a method for assessing social support systems. Mental Health and Society, 1977, 4 (3-4), 163-170.
- Henderson, S., Byrne, D. G., Duncan-Jones, P., Adcock, S., Scott, R., & Steele, G. P. Social bonds in the epidemiology of neurosis: A preliminary communication. British Journal of Psychiatry, 1978, 132, 467-472..
- Holohan, C. J., Betak, J. F., Spearly, J. L., & Chance, B. Social support, race, and mental health. An interactional field study. Paper presented at the 87th Annual Meeting of the American Psychological Association, New York, September, 1979.
- Holohan, C. J., & Wilcox, B. L. Residential satisfaction and friendship formation in high and low rise student housing: An interactional analysis. Journal of Educational Psychology, 1978, 70, 237-241.
- Homans, G. Social behaviour: The elementary forms. New York: Harcourt, Brace, & World, 1961.
- Horwitz, A. Social networks and pathways to psychiatric treatment. Social Forces, 1977, 56 (1), 86-105.

- Hulka, B., Cassel, J., Kripper, L., & Burdette, J. Communication compliance, and concordance between physicians and patients with prescribed medications. American Journal of Public Health, 1976, 66, 847-853.
- Kapferer, B. Social network and conjugal role in urban Zambia: Toward a reformulation of the Bott hypotheses. In J. Boissevain and J. C. Mitchell (Eds.), Network analysis: Studies in human interaction. The Hague: Mouton, 1973.
- Kaplan-DeNour, A., & Czaczkes, J. W. Professional team opinion and personal bias: A study of the chronic hemodialysis unit team. Journal of Chronic Diseases, 1971, 24, 533-541.
- Kasl, S. U. Issues in patient adherence to health care regimens. Journal of Human Stress, 1975, 1, 5-17.
- Kelley, J. G. The ecology of social support systems: Footnotes to a theory. Paper presented at the symposium Toward an Understanding of Natural Support Systems at the 85th Annual Meeting of the American Psychological Association, San Francisco, California, 1977.
- Kirscht, J. P., & Rosenstock, I. M. Patients' problems in following recommendations of health experts. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.), Health Psychology, San Francisco: Josey Bass, 1979, p. 189.
- Langlie, J. K. Social networks, health beliefs, and preventive health behaviour. Journal of Health and Social Behaviour, 1977, 18, 244-260.

- LaRocco, J. M., House, J. S., & French, J. R. Social support, occupational stress and health. Journal of Health and Social Behaviour, 1980, 21 (3), 202-218.
- Levy, N. B., & Wynbrandt, G. D. The quality of life on maintenance hemodialysis. Lancet, 1975, 13, 1328.
- Lieberman, M. A., & Mullan, J. T. Does help help? The adaptive consequences of attaining help from professionals and social networks. American Journal of Community Psychology, 1978, 6 (5), 499-517.
- Levy, P. Towards better doctor-patient communications. In A. E. Bennett (Ed.), Communications between doctors and patients. London: Oxford University Press, 1976, 75-98.
- Malmquist, A. Factors in psychiatric prediction of patients beginning hemodialysis: A follow-up of 13 patients. Journal of Psychosomatic Research, 1972, 16 (1), 19-23.
- Mayer, A. C. The significance of quasi-groups in the study of complex societies. In M. Banton (Ed.), The Social Anthropology of Complex Societies. London: Tavistock, 1966.
- McCallister, L., & Fischer, C. A procedure for surveying personal networks. Sociological Methods and Research, 1978, 7 (2), 131-145.
- McFarlane, A. H., Norman, G. R., Streiner, D. L., Roy, R., & Scott, D. J. A longitudinal study of the influence of the psychosocial environment on health status: A preliminary report. Journal of Health and Social Behaviour, 1980, 21, 124-133.

- McKinlay, J. B. Some approaches and problems in the study of the uses of services: An overview. Journal of Health and Social Behaviour, 1972, 13, 115-152.
- McKinlay, J. B. Social networks, lay consultation and help seeking behaviour. Social Forces, 1973, 51, 275-293.
- Meldrum, M. W., Wolfram, J. G., & Rubini, M. E. The impact of chronic hemodialysis upon the socioeconomics of a veteran patient group. Journal of Chronic Diseases, 1968, 21, 37.
- Menzies, I. E., & Stewart, W. K. Psychiatric observations on patients receiving regular dialysis treatment. British Medical Journal, 1968, 1, 544.
- Mitchell, J. C. The concept and use of social networks. In J. C. Mitchell (Ed.), Social networks and urban situations. Manchester: Manchester Press, 1969.
- Mitchell, J. C. Social networks. Annual Review of Anthropology, 1974, 3, 279-299.
- Mitchell, R. E. Coping style, psychosocial climate, and system linkages as correlates of social networks. Unpublished manuscript, University of Maryland, College Park, Md., 1979.
- Mitchell, R. E., & Trickett, E. J. Task force report: Social networks as mediators of social support. An analysis of the effects and determinants of social networks. Community Mental Health Journal, 1980, 16 (1), 27-44.
- Mueller, D. P. Social networks: A promising direction for research on the relationship of the social environment to psychiatric disorder. Social Science and Medicine, 1980, 14, 147-161.

- O'Brien, M. E. Hemodialysis and affective social environment: Some social and social-psychological correlates of the treatment for chronic renal failure. (Doctoral dissertation, Catholic University of America, 1976). Dissertation Abstracts International, 1977, 37 (02), 1042B. (University Microfilms No. 76-18, 136)
- Pattison, E. M., DeFrancisco, D., Wood, P., Frazier, H., & Crowder, J. A psychosocial kinship model for family therapy. American Journal of Psychiatry, 1975, 132, 1246-1251.
- Pearlin, L. L., & Schooler, C. The structure of coping. Journal of Health and Social Behaviour, 1978, 19, 2-21.
- Pentecost, R. L., Swerenz, B., & Manuel, J. W. Intrafamily identity and home dialysis success. Nephron, 1976, 17, 88.
- Pilisuk, M., & Froland, C. Kinship, social networks, social support and health. Social Science in Medicine, 1978, 12 (2), 273-280.
- Pratt, L. Conjugal organization and health. Journal of Marriage and the Family, 1972, 2, 85-95.
- Pratt, L. Family structure and effective health behaviour. Boston: Houghton-Mifflin, 1976.
- Pritchard, M. Meaning of illness and patient's response to long term hemodialysis. Journal of Psychosomatic Research, 1974, 18 (6), 457-464.
- Rabkin, J. G., & Struening, E. L. Life events, stress, and illness. Science, 1976, 191, 1013.
- Rodin, J., & Janis, I. L. The Social Power of Health-Care Practitioners as Agents of Change. Journal of Social Issues, 1979, 35 (1).

- Rosenstock, I. M. Patients compliance with health regimens. Journal of the American Medical Association, 1975, 234, 402-403.
- Roter, D. L. Patient participation in the patient-provider interaction: The effects of patient question asking on the quality of interaction, satisfaction, and compliance. Health Education Monographs, 1977, 5 (4), 281-315.
- Sackett, D. L. Priorities and methods for future research. In R. B. Haynes, D. W. Taylor and D. L. Sackett (Eds.), Compliance in Health Care. Baltimore, Maryland: The Johns Hopkins University Press, 1976.
- Salloway, J. C., & Dillon, P. B. A comparison of family networks and friend networks in health care utilization. Journal of Comparative Family Studies, 1973, 4, 131-142.
- Sand, P. S., Livingstone, G., & Wright, R. B. Psychological assessment of candidates for hemodialysis programs. Annals of Internal Medicine, 1966, 64, 602-610.
- Schoenfield, P. Y., & Humphreys, H. H. A general description of the uremic state. In B. M. Brenner & F. Rector (Eds.), The Kidney, (Vol. II). Philadelphia: W. B. Saunders and Co., 1976, p. 1432.
- Shulman, N. Network analysis: A new addition to an old bag of tricks. Acta Sociologica, 1976, 19, 307-323.
- Snyder, W. L. Factors affecting adherence to diet and medication orders by hemodialysis patients. Abstracts of Hospital Management Studies, 1977, 14 (2). (University Microfilms No: 18102, 67)

- Sokolovsky, J., Cohen, C., Berger, D., & Gerger, J. Personal networks of ex-mental patients in a Manhattan S.R.O. hotel. Human Organization, 1978, 37 (1), 5-15.
- Speck, R. J., & Attneave, C. L. Family Networks. New York: Random House, 1973.
- Stimson, G. V. Obeying doctors orders: A view from the other side. Social Science in Medicine, 1974, 8, 79-104.
- Stone, G. C. Patient Compliance and the Role of the Expert. Journal of Social Issues, 1979, 35 (1).
- Strauch-Rahauer, G., Schafheutle, R., Lipke, R., & Strauch, M. Measurement problems in long-term dialysis patients. Journal of Psychosomatic Research, 1977, 21, 49-54.
- Stueve, A., & Gerson, K. Personal relations across the life cycle. In C. S. Fischer (Ed.), Networks and Places, New York: Free Press, 1977.
- Suchman, E. Social patterns of illness and medical care. Journal of Health and Human Behaviour, 1965, 6, 2-16.
- Svaretad, B. L. Physician-patient communication and patient conformity with medical advice. In D. Mechanic (Ed.), The growth of bureaucratic medicine. New York: Wiley, 1974.
- Taylor, S. E. Hospital patient behaviour: reactance, helplessness, or control? Journal of Social Issues, 1979, 35 (1).
- Thibaut, J. W., & Kelley, H. H. The social psychology of groups. New York: Wiley, 1959.

- Tolsdorf, C. C. Social networks and the coping process. (Doctoral dissertation, University of Massachusetts, 1975). Dissertation Abstracts International, 1976, 36 (09), 4713B. (University Microfilms No. 76-5403, 146)
- Tolsdorf, C. C. Social networks, support; and coping: An exploratory study. Family Process, 1976, 15 (4), 407-417.
- Towne, W. S., & Alexander, L. Psychological correlates of emotional adjustment in hemodialysis patients. Dialysis and Transplantation, 1980, 2 (4), 364-373.
- Viederman, M. Adaptive and maladaptive regression in hemodialysis. Psychiatry, 1974, 37, 68-77.
- Walker, K. N., MacBride, A., & Vachon, M. L. Social support networks and the crisis of bereavement. Social Science in Medicine, 1977, 11, 35-41.
- Weiss, R. S. The provisions of social relationships. In Z. Rubin (Ed.), Doing unto others. Englewood Cliffs, N.J.: Prentice-Hall, 1974.
- Wertzel, H., Wollrath, P., Ritz, E., & Ferner, H. Analysis of patient-nurse interaction in hemodialysis units. Journal of Psychosomatic Research, 1977, 21, 359.
- Whitten, N., & Wolfe, A. Network analysis. In J. Honigsmann (Ed.), Handbook of Social and Cultural Anthropology. Chicago: Rand McNally, 1974, 717-746.
- Wijsenbeek, H., & Munitz, H. Group treatment in a hemodialysis center. Psychiatria, Neurologia, Neurochirurgia, 1970, 73 (3), 213-220.

- Winokur, M. Z., Czaczkes, J. W., & DeNour, A. K. Intelligence and adjustment to chronic hemodialysis. Journal of Psychosomatic Research, 1973, 17 (1), 29-34.
- Yallen, K. Patient psychology. Contemporary Dialysis, 1980, (Dec.), 26.
- Yanagida, E. H., & Streltzer, J. Limitations of psychological tests in a dialysis population. Psychosomatic Medicine, 1979, 41 (7), 557-567.

VITA AUCTORIS

Peter Burgher was born August 6, 1947, in Rochester, New York. He attended M. B. Anderson Elementary School and East High School in Rochester, New York. He matriculated in September, 1965 at Lehigh University in Bethlehem, Pennsylvania and graduated in June, 1969 with a Bachelor of Arts degree in philosophy. During the period June, 1971 to June, 1973, he was enrolled as a nonmatriculated graduate student in psychology at the University of Rochester. In September, 1973 he entered the graduate programme in psychology at the University of Windsor, completing a Master of Arts degree in September, 1976. During the years 1974-1977, he completed clinical psychology internship training at the Clarke Institute of Psychiatry in Toronto, Ontario, the Kitchener-Waterloo Hospital in Kitchener, Ontario, and the Psychological Services Center at the University of Windsor. Between September 1979 and September 1981 he was employed as a research assistant in psychology at the Ford Hospital in Detroit, Michigan. He is a graduate of the Gestalt Institute of Cleveland.