HEALTH BELIEFS AND DIETARY COMPLIANCE

IN ADULT DIABETICS

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A THESIS

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The Lord is my strength and my song . . .

Exodus 15:2

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Six million Americans are diagnosed diabetics.
Most of these individuals would not have the disease if
they had avoided obesity. As in other affluent societies,
the majority of these diabetics are overweight, have some
endogenous insulin, and develop observable symptoms after
40 years of age. Experts in the field of diabetes have
agreed on one point for years--diet is the fundamental
element in the treatment of adult-onset diabetes.

Another fundamental issue in diabetic management
is the extent to which the diabetic must be responsible
for his own care at home. Due to the chronic nature of
his disease, the diabetic must regulate each day's activ-
ities to achieve and maintain an optimum level of well-
ness. The most basic area for regulation is diet.

Essential to control of dietary intake is the
patient's adherence to professional recommendations.
According to the 1964-1965 National Health Survey (cited
in Holland 1968), only 53 percent of American diabetics
indicated that they followed a special diet. This figure
indicates that lack of dietary adherence is a substantial

1

problem. A thorough understanding of factors influencing dietary adherence may enable the nurse better to assist diabetics with their health care.

Statement of the Problem

The problem of this study was the determination of the relationship between general health beliefs and dietary compliance in the adult diabetic.

Justification of Problem

Diabetes mellitus is a chronic metabolic disease characterized by an absolute or relative lack of insulin resulting in the body's defective carbohydrate, protein, and fat utilization (Smith 1977). Eighty percent of all diabetics are of the non-insulin-dependent type. These diabetics produce enough insulin to keep the plasma glucose normal after losing their excess weight. Therefore, the most natural form of therapy for non-insulin-dependent diabetes is diet therapy by control of caloric intake (American Diabetes Association 1977). Approximately one-half of all diabetic Americans could be "'cured' by permanent reversal of obesity" (West 1976, p. 216).

Unfortunately, few American diabetics have achieved this "cure." Various studies have shown that only a small percentage of diabetics understand and follow

diet instructions on a long-term basis. Stone (1961) concluded that the reason for poor diabetic control in the majority of 126 patients was ineffective dietary therapy. Data obtained in the 1964-65 National Health Survey revealed that of a representative group of diabetics 22 percent stated they were not given a diet, 25 percent stated they had received a diet but had not followed it, and 53 percent stated they followed a prescribed diet (Holland 1968).

Using more detailed methods than the Health Survey, Williams et al. (1976a) studied one group of sixty patients and another group of seventeen patients. The larger group gave a 24-hour recall of food eaten while the smaller group kept food intake records for seven days. Of the one-day recall group, only one patient in eight followed his diet on that day. Over three-fourths of the patients recording for seven days were not eating prescribed foods at the prescribed frequencies (Williams et al. 1967a).

Equally discouraging trends were identified by studies conducted by the University Group Diabetes Program (Goldner, Knatterud, and Prout 1971). This group of thirty-five diabetic experts was formed to conduct and review clinical trials in order to define the

relationship between the control of blood glucose and vascular complications in adult-onset diabetics. The eleven year study, beginning in 1961, followed 810 diabetics divided into four subgroups according to their therapeutic regimen. Dietary instructions were similar for each subgroup with the major dietary objection being reduction of caloric consumption. Although the mean body weight of the subjects was 133 percent of the standard weight, only 1 percent to 3 percent mean loss was achieved initially. This small loss was short-lived, for within 4.5 years the mean weights had increased an average of approximately 1 percent in three of the four subgroups (Goldner, Knatterud, and Prout 1971). Interesting to note in this extended study is the demonstration of an excess cardiovascular mortality among the patients in the subgroup treated with tolbutamide. This finding creates a greater necessity for dietary therapy rather than therapy with this oral hypoglycemic.

The above studies indicate a lack of adherence to dietary prescriptions among diabetics. The extent to which patients adhere to or follow medical advice has been termed "compliance" by medical experts (Becker and Maiman 1975). In recent years, increasing numbers

of health professionals have become interested in this phenomenon which greatly influences the delivery of health care. Much of the literature in this area deals with drug-related compliance in non-diabetic diseases. In Marston's (1970) review of compliance-related literature, only one article of thirty-five concerned compliance in diabetics. Although Mitchell (1974) included ten diabetes-related articles in a review of ninety-eight articles on compliance, only three were written within the past fifteen years. Seemingly, a lack of recent studies concerning dietary compliance in diabetics exists.

Several studies exist that attempt to identify factors that determine compliance. Most of this research consists of descriptive comparisons of compliant and non-compliant patients. One aspect of the Purdue Farm Cardiac Project, conducted from 1956 to 1960, focused on factors affecting compliant and noncompliant behavior in 397 farmers, 230 of them with some form of cardiac disease. The data collected suggested that those farmers who had positive attitudes toward health were more likely to continue complying than those with negative attitudes toward health (Davis 1966). Becker and Maiman's (1975) review of compliance-related research suggested that certain

health beliefs, health-related motivations, percep-
tions of costs of the recommended therapy, aspects of
the doctor-patient relationship, and social influence
are the most promising factors to study (Becker and
Maiman 1975). A group of researchers at McMaster Uni-
versity Medical Center has been collecting compliance-
related literature since 1972. These factors are
summarized below.

Their careful review of literature with special
attention to scientific merit and the weight of evidence
confirmed the relationship between noncompliance and
five categories of factors. These categories are:

> . . . features of the disease, features of the
> therapeutic regimen, features of the therapeutic
> source, features of the patient-therapist inter-
> action, and sociobehavioral features of the
> patient (Haynes 1976, p. 39).

Under the category of features of the disease,
the one factor that is associated with noncompliance is
the diagnosis of a psychiatric illness. Therapeutic
regimens that are complex, that require extensive be-
havior changes, or that continue over an extended period
of time reduce compliance. With respect to features of
the therapeutic source, inefficient and inconvenient
clinic facilities are related to noncompliance. The
incidence of noncompliance is greater when patient and

therapist interaction is characterized by inadequate
supervision or dissatisfaction with the therapist.
Sociobehavioral features of the patient that are associ-
ated with noncompliance are inappropriate health beliefs,
a history of noncompliance with other regimens, and an
unstable family environment (Haynes 1976).

Of all the factors, inappropriate health beliefs
contain the most consistent predictors of compliance:
"the patients' perceptions of disease severity, personal
susceptibility, barriers to action, and efficacy of
therapy" (Sackett 1976, p. 172). These same areas are
basic components of the Health Belief Model formulated
in 1966 by Rosenstock. This Health Belief Model (HBM)
has been used to predict compliance with preventive health
measures such as annual check-ups, screening x-rays, and
immunizations (Rosenstock 1966). Becker (1974) suggested
that the Health Belief Model should be used to study com-
pliance in persons diagnosed as ill as well as those being
given preventive recommendations. Becker joined the group
at McMaster University in 1974 to develop a patient ques-
tionnaire for use in compliance studies. The questions
in this tool relate basically to these areas of the Health
Belief Model--susceptibility, severity, efficacy, and
obstacles or barriers. Included also are questions to

assess demographic data, knowledge of the disease and its treatment, general health motivation, patient-clinician interaction, and cues to action. The group has encouraged the use of the standardized questionnaire to aid in pooling data from a variety of health settings in order to identify universal predictors of compliance (Sackett 1976). On an individual basis, the questionnaire or parts of it, could be helpful in obtaining a compliance-oriented history. This information would then be vital for planning interventions to improve patient compliance to prescribed diets.

Since dietary noncompliance is so prevalent among diabetic patients, there is a need to minimize the major obstacles to compliant behavior. Of the factors studied, health beliefs seem to be most related to dietary compliance. If health beliefs can be assessed in the diabetic, individualized interventions can be planned to aid the patient in improving dietary compliance. A working knowledge of dietary compliance derived from this study may improve the diabetic nurse specialist's effectiveness in assisting the diabetics in this study to control their disease.

Theoretical Framework

The theoretical framework for this study is the Health Belief Model hypothesized by Becker (1974). Becker's model is based on the Health Belief Model formulated by Hochbaum (1958) in the Public Health Service between 1950 and 1960. In that the model describes or predicts behavior under conditions of uncertainty, it is a "value-expectancy model" (Becker and McClintock 1967). Specifically, the model relates "theories of decision-making to an individual's decision about alternative health behaviors" (Maiman and Becker 1974, p. 9). According to Rosenstock (1966), the original model was derived from Lewin's theory of decision making which hypothesized that an individual's behavior is dependent upon the value he places on a particular outcome and his estimate of the probability that a given action will result in that outcome.

Lewin's (1951) theory of decision making utilizes a goal-setting type of model in a level of aspiration situation. Level of aspiration is that degree of performance that an individual strives to reach based on knowledge of his past performance in the same task. General level of aspiration theory assumes that when setting a goal, an individual is confronted by a

situation of choice where choice is controlled by posi-
tive or negative valences. The basic theory is that
an individual selects his path of action according to
possible outcomes, his personal needs, and the barriers
to the goal (Lewin 1951).

Maiman and Becker (1974) have expanded the
original Health Belief Model to include a separate
motivational variable based on Atkinson's (cited in
Maiman and Becker 1974) model of risk-taking behavior
in achievement motivation. Like Lewin (1951), Atkinson
assumed that an individual's choice of a task with a
specific degree of difficulty depends upon his tendency
to approach success and to avoid failure (Maiman and
Becker 1974).

In this theory of motivation, Lewin (1951)
emphasized a single variable: valence. Atkinson (cited
in Maiman and Becker 1974), however, explained motivation
using two separate variables: incentive and motive. In-
centives (the attractiveness of success or failure) are
assumed to be situationally aroused, depending on past
experiences. Motives (the more general tendencies of an
individual toward a class of incentives) are assumed to
be stable, operating within the individual from one situa-
tion to another. The revised Health Belief Model and

and Atkinson's (cited in Maiman and Becker 1974) model
are similar conceptualizations in that they both pro-
pose a separate and independent motivational dimension
(Maiman and Becker 1974).

Originally, the Health Belief Model was con-
structed to predict compliance in the area of preventive
health measures such as annual checkups, screening
tests, and immunizations. Becker and Maiman (1975)
hypothesized that individuals

> . . . will generally not attempt to diagnose or
> prevent a condition unless they possess minimal
> levels of relevant health motivation and knowl-
> edge, perceive themselves as potentially vulnerable
> and the condition as threatening, are convinced of
> the efficacy of intervention, and see few diffi-
> culties in undertaking the recommended action
> (p. 12).

Becker (1974) cited several studies which have
also applied the Health Belief Model to "sick-role
behavior" and have shown its value for predicting com-
pliance with prescribed therapies. On the basis of
this literature, Becker (1974) has modified the Rosen-
stock (1966) model to explain and predict more fully
compliance with health and medical care recommendations.

Rosenstock's (1966) Health Belief Model explained
the individual's health behavior as determined by his
perceived susceptibility to a particular illness and his

perception of the severity of the disease. Behavior was also related to the value the individual placed on the recommendation action; that is, the benefits or usefulness of the action in reducing susceptibility and/or severity minus the costs or barriers involved in taking the specific action. Cues to action are necessary to stimulate the particular health activity. Finally, demographic and sociopsychological variables are shown to affect an individual's motivations and perceptions but are not directly responsible for compliance (Rosenstock 1966).

Becker and Maiman (1975) modified the Health Belief Model by adding the susceptibility variable to include the individual's belief in the accuracy of the diagnosis, his perception of his resusceptibility (the likelihood of recurrence), and his feelings of vulnerability to other illnesses. The severity variable is more related to compliance in Becker's model since a diagnosis has been made and symptoms are or have been existent. Specific items in the Becker model paralleling benefits and barriers are the following: (1) extent of possible bodily harm, (2) extent of possible interference with social roles, (3) the regimen's safety, and (4) the regimen's efficacy (Becker and Maiman 1975).

As previously stated, Becker and Maiman (1975) expanded Rosenstock's (1966) Health Belief Model by adding a motivational variable. Motivation is the emotional arousal in an individual created by certain stimuli. Becker and Maiman included positive aspects of health whereas Rosenstock dealt only with negative aspects. Becker and Maiman included sociobehavioral variables as did Rosenstock in a category labeled "modifying factors." Particularly relevant variables in this area are patient-practitioner interaction, physician continuity, and social pressures.

Supported by extensive review and research, Becker and Maiman have related the Health Belief Model to sick role behaviors. They believed that the model can be useful as a guide for future research in the area of patient-related aspects of health care delivery, specifically--compliance.

Assumptions

The assumptions for the study were as follows:

1. An individual's behavior is determined by his perceptions of his world rather than by his actual environment

2. An individual's current state of affairs determines behavior with only secondary influence from past experience

3. An individual must be motivated in order to act

4. An individual's motives determine his perceptions of the environment

5. An individual normally perceives disease as a negative condition; that is, a condition to be avoided

6. An individual's choice to comply or not to comply with health recommendations is ultimately the product of a personal decision-making process

7. An individual's responses to a health belief questionnaire are indicative of his beliefs regarding his state of health

Hypothesis

The null hypothesis for the purpose of this study was:

There is no significant relationship between a diabetic patient's general health beliefs and his compliance with dietary therapy.

Definition of Terms

For the purposes of this study, the following terms were used as defined:

1. Belief--the emotional acceptance of a proposition or doctrine on what one considers to be adequate grounds (English and English 1958)

2. Health belief--the emotional acceptance of a proposition relating to one's psychophysiological status

3. Compliance--the extent to which an individual adheres to or follows medical advice (Becker and Maiman 1975)

4. Dietary compliance--the extent to which an individual follows dietary instructions prescribed by a health professional

5. Dietary prescription--any diet plan recommended by a qualified health professional; may be quantitative or qualitative; synonymous with dietary regimen, therapy, or regulation

6. Diabetic--an individual who has been diagnosed as lacking an adequate amount of insulin to utilize properly his body's carbohydrate, protein, and fat intake (Smith 1977)

(a) Insulin-dependent diabetic--an individual whose pancreas does not produce enough insulin to maintain adequate metabolism; synonymous with ketosis-prone or juvenile-onset diabetic (American Diabetes Association 1977)

(b) Non-insulin dependent diabetic--an individual whose pancreas produces enough insulin to maintain adequate metabolism if the individual is not overweight; synonymous with ketosis-resistant or adult-onset diabetic (American Diabetes Association 1977)

(c) Controlled diabetic--a diabetic with a normal fasting blood sugar, a desirable body weight, and good health characterized by no major infections or complications in the past six months (Crampton 1966)

7.   Health professional--a physician, physician's assistant, nurse specialist, or nurse practitioner

8.   Overweight--description of an individual with a body weight above that designated as desirable weight by the Metropolitan Life Insurance Company (Goldner, Knatterud, and Prout 1971)

Limitations

Limitations of this study were as follows:

1.   Health beliefs of the subjects may have existed prior to treatment or as a result of treatment

2.   The study measured compliance in a group of diabetic patients, the majority of whom were non-Anglo Americans with low incomes

3.   The subjects were at differing stages in their diabetic treatment

4.   The subjects did not have identical treatment regimens; i.e., some were taking oral hypoglycemics or insulin, some were strictly on dietary therapy

Summary

This study was conducted to determine the relationship between the general health beliefs and the dietary compliance of a group of adult diabetic patients. To guide and support the diabetic patient effectively in accepting responsibility for his own care, the nurse must have an understanding of the factors that influence that care, specifically compliance with dietary therapy. Therefore, it is necessary to examine the influence that health beliefs may have on dietary compliance.

CHAPTER II

REVIEW OF LITERATURE

Utilizing the nursing process effectively to
improve the quality of care of the adult diabetic patient
requires an understanding of diabetic diets, compliance
behavior, and beliefs related to health activity. The
review of literature addresses the areas of diabetic
diet, compliance, and health beliefs. The review of
literature on diabetic diets presents the pathogenesis
and dietary goals of diabetes mellitus and discusses
the determination and implementation of diet prescrip-
tions. The review of literature on compliance relates
to determinants, measurement, and interventions of com-
pliance and reviews various therapeutic regimens. The
review of literature on health beliefs traces the origin
and evolution of the Health Belief Model in relation to
preventive health practices and illness behavior.

The Diabetic Diet

From the earliest description of diabetes mel-
litus in the Papyrus Ebers in 1500 B.C. (cited in Arky
1978a), man has conjectured about the relation of the

18

disease to dietary intake. Recent advances in dia-
betes therapy--pancreatic transplantation, islet cell
transplantation, artificial beta cell devices, glucagon-
suppression by somatostatin--offer promise as alterna-
tives to traditional diet therapy. However, a cure for
diabetes is not imminent and diet is still the corner-
stone of diabetes management. Regardless of insulin or
oral hypoglycemics, no diabetic patient can be treated
successfully unless a diet is followed (Kozak 1977;
Raskin 1979). A renewed awareness of the basic role
of diet in diabetes treatment has come about since the
University Group Diabetes Program (Goldner, Knatterud,
and Prout 1971) reported the first results of its study.
This investigation of the efficacy of oral hypoglycemic
agents concluded that diet alone may be more effective
than other therapeutic agents in prolonging the life
of the diabetic (Goldner, Knatterud, and Prout 1971;
Arky 1978b).

Pathogenesis of Diabetes Mellitus

Basic to effective use of diet therapy is the
understanding of the pathogenesis of diabetes and the
knowledge of the "site of action" of the therapy (Arky
1978b, p. 655). Arky (1978b) has stated that diabetes

mellitus has two basic etiologies: the defective beta
cell of the islets of Langerhans which is characterized
by insulin deficiency and the resistance to the effec-
tiveness of insulin in peripheral tissue (muscle, liver,
and adipose) which is characterized by normal or ele-
vated amounts of circulating insulin. Both conditions
may coexist in some diabetics. Patients with defective
beta cells are "insulin-dependent" or "ketone-prone" and
patients with resistance to insulin are "non-insulin-
dependent" and are frequently overweight. Vague and
Vague (1979) have identified hyperinsulinism as the key
to explaining the relationship between obesity and dia-
betes. Vague and Vague found that hyperinsulinism
existed at the onset of diabetogenic obesity, during
the first two stages of normal oral glucose tolerance,
and chemical diabetes. In the advanced stages of dia-
betes, hyperinsulinemia decreases. Weight loss has been
found to diminish the high insulin levels during the
first two stages. Insulin resistance has been found to
exist in diabetogenic obesity at the chemical and later
stages. This is due in part to a reduced number of re-
ceptor sites for insulin. Positive feedback slowly
accentuates the phenomenon--hyperinsulinemia → reduced
receptors → resistance to the effects of insulin →

increased secretion of hormone. Flood (1979) has sug-
gested explaining the pathophysiology of diabetes to
appropriate patients by pointing out that (1) the number
of insulin receptors is reduced when obesity is con-
current with diabetes, (2) a restrictive diet causes
the pancreas to secrete less insulin, (3) less insulin
will reach the peripheral cells, (4) the cells will then
compensate by producing additional receptor sites, and
(5) the insulin produced may then act more efficiently
and the blood sugar will be lowered. However the expla-
nation is worded, it should reinforce for the patient
the idea that diet alone is specific treatment for
obesity-related diabetes.

Dietary Goals for Diabetes

Diabetic research has produced major advances
in understanding beta cell physiology and diabetic
physiology, but few practical studies relating dietary
modifications and diabetes have been attempted (Arky
1978a). Although many questions concerning the exact
relationship of diet and diabetes remain unanswered,
the goals of diet therapy for diabetes are distinct and
definite. The American Diabetes Association (1977) has
outlined the following goals of diabetes diet therapy:

I. Attain and maintain desirable body weight.

II. Provide a normal growth rate in children and pregnant women.

III. Minimize glycosuria and keep the plasma glucose as near normal physiological range as possible.

IV. Prevent and/or delay the development and/or progression of cardiovascular, renal, retinal, neurological, and other complications associated with diabetes.

V. Modify the diet as necessary for complications of diabetes and for associated diseases.

VI. Improve the overall health of the patient by attaining and maintaining an optimal nutritional status.

VIII. Provide for each patient an individualized educational and follow-up program (American Diabetes Association 1977, p. 6).

Other sources that discuss dietary goals for the diabetic may place greater emphasis on one or more of the above goals but are in basic accordance with the American Diabetes Association (1977) goals (Kaufman 1977; Palumbo 1977; West 1977; Arky 1978a; Hamburger, Covinsky, and Kelley 1979).

Determining the Dietary Prescription

Marble (1978) has stated that the diabetic diet should be a modification of a normal diet that promotes good health and not a diet disrupting normal living. The diet for diabetic patients should consist of the same basic nutrients as for all individuals--adequate quality and quantity of protein and other recommended

nutrients such as vitamins, minerals, and essential
fatty acids. The American Diabetes Association's
(1977) guidelines concur with the National Research
Council's (Bierman et al. 1971) recommended daily
dietary allowances.

Most experts have agreed that the specifics
of dietary prescription depend upon the type of dia-
betes being treated (West 1977; Arky 1978a; Flood 1979;
Franz 1979). West (1977) has contrasted dietary strat-
egies for the two common types of diabetic patients,
obese patients who do not require insulin and nonobese
patients who are insulin-dependent. A reduction of
calories is necessary for the first group but not neces-
sary for the latter group. Beta cell function must be
improved in obese non-insulin-dependent patients whereas
nonobese insulin-dependent patients usually have no
beta cell function. A consistent daily intake of cal-
ories, carbohydrate, protein, and fat is not crucial
for obese non-insulin-dependent patients but very impor-
tant for nonobese insulin-dependent patients. The number,
timing, and frequency are not that significant for obese
non-insulin dependent patients although these variables
are very significant in the dietary treatment of insulin-
dependent patients. Due to the marked differences in

these treatment strategies, West (1977) has ques-
tioned attempts to generalize concepts and practices
regarding diabetic diets or to teach dietary practices
to both groups in the same session. West has contended
that the major treatment strategy for typically obese
diabetics is the reduction of excessive fat tissue.

In 1975, the National Commission of Diabetes
(cited in Franz 1979) reported that 70 percent of non-
insulin-dependent diabetic patients in the United States
were overweight when diagnosed. Most of these diabetic
patients produce enough endogenous insulin to maintain
normal blood glucose levels if they are able to achieve
adequate weight loss (Franz 1979). The prime objective
for this type of diabetes is restriction of calories.
Formulas have been useful to estimate the number of
calories required to produce weight loss in an individual
based on ideal body weight and activity level (Davidson
1974). A moderate weight loss of ten to fifteen pounds
has been accompanied by an improvement in glucose toler-
ance. A weight loss of one to two pounds per week has
been considered to be satisfactory progress as the patient
approaches his ideal body weight (Arky 1978a; Flood
1979).

Specific guidelines for variations in the diabetic diet beyond caloric requirement have been suggested. The most disputed question has been whether or not the diabetic patient's intake of carbohydrates should be restricted. The American Diabetes Association (cited in Bierman et al. 1971) stated, "There no longer appears to be any need to restrict disproportionately the intake of carbohydrates in the diet of most diabetic patients" (p. 633). Arky (1978a) has specified that the diabetic patient should consume 55 percent to 60 percent of his total calorie intake as carbohydrates with no more than 15 percent of total carbohydrate calories being simple carbohydrates (glucose, fructose, sucrose). Kent (1978) has recommended a lower level of 45 percent based on the average carbohydrate intake of the United States' population as a whole. Weinsier et al. (1974) studied two groups of diabetics, one on a diet of 40 percent carbohydrate and the other on a diet of 60 percent carbohydrate. Weinsier et al. concluded that non-insulin-dependent diabetes could be controlled with a diet high in carbohydrate since there was no significant difference in the two groups' mean diabetic control scores.

One British study (Hadden et al. 1975) that restricted its diabetic subjects' food intake in

proportion to their excess weight reported a mean
daily intake of 1,540 calories with carbohydrates
limited to 40 percent of the total caloric intake.
Hadden et al. (1975) stated that the rapid decrease
in fasting blood glucose levels found in their subjects
during the first month of treatment lends support to
the concept that carbohydrate restriction rather than
weight loss is the determining factor in diabetic
control. Weight loss was not great enough initially
to account for the marked decrease in glucose values.

Other studies, however, have emphasized that
calorie restriction is the prime causal factor related
to significant increases in insulin binding to receptor
cells. Thus, this is the method of choice for producing
rapid recovery of normal fasting glucose concentrations
and eventual recovery of the pancreatic secretory
response (Bar et al. 1976; Savage et al. 1979). West
(1971a) has disputed that carbohydrates are diabetogenic
by reporting the observation that prevalence of diabetes
in several populations around the world is most consis-
tently associated with obesity rather than with the
consumption of a specific type of food. Studies have
even shown that some diabetic patients may benefit from
a high-carbohydrate diet (Brunzell et al. 1974; Bierman

and Nelson 1975). The American Diabetes Association
(1977) has designated that carbohydrate content should
be 50 percent to 70 percent of nonprotein calories.

As with carbohydrates, the recommendations for
proportionate values of protein and fat in the non-
insulin-dependent diet vary somewhat. Arky (1978b) has
specified that protein calories should account for 10
percent to 15 percent of the total calories intake
while Palumbo (1977) has suggested 20 percent protein.
The Joslin Clinic has recommended that protein intake
be 20 percent of the caloric content of the diet (Kauf-
man 1977). The American Diabetes Association (1977)
has designated that protein intake should be a minimum
of .5 grams per pound of desired body weight. Recom-
mendations for fat content of the diabetic diet range
from 30 percent (American Diabetes Association 1977) to
35 percent (Palumbo 1977; Arky 1978b). The Joslin
Clinic (Kaufman 1977) has found that their diabetic
patients do not tolerate the higher carbohydrate level
as well as the lower, so it has increased the fat content
in patients' diet to 40 percent in order to replace some
of the carbohydrate calories except where contraindicated.
Diabetic experts have supported individualizing the dia-
betic diet prescription by restricting the cholesterol,

saturated fats, sodium, and potassium as indicated
for each patient's disease process (American Diabetes
Association 1977; Kaufman 1977; Palumbo 1977; Arky
1978b). In summary, the obese non-insulin-dependent
diabetic patient's dietary prescription should consist
of a calorie intake dependent upon ideal body weight
and activity level with appropriate ratios of nutrients:
10 percent to 20 percent of total calories as protein,
40 percent to 60 percent as carbohydrates, and 30 per-
cent to 40 percent as fat.

Implementing the Diet Prescription

Once the specific diabetic diet has been deter-
mined, it needs to be translated into terms the patient
can easily use. The most widely used system is the
Exchange Lists for Meal Planning developed by the Ameri-
can Diabetes Association in 1950 and revised in 1976
(cited in Franz 1979). The exchange system has divided
food into six groups: (1) skim milk, (2) vegetables,
(3) fruit, (4) bread, (5) lean mean, and (6) fat. The
foods in each group contain similar amounts of calories,
carbohydrate, protein, and fat. Patients choose a food
from whichever group their diet plan indicates. They
may exchange one food for another within the same food

group. Most of the foods on the lists do not contain refined sugar (Franz 1979). The 1976 revision has provided more accurate, flexible, and simplified guidelines with an emphasis on calorie reduction and modification of fat intake (American Diabetes Association 1977).

The Joslin Clinic's (Kaufman 1977) diabetic food lists resemble the American Diabetes Association's (1977) exchange lists with a few exceptions. Rather than exchange lists, the Joslin Clinic calls these substitute lists. These substitute lists consist of two fruit lists--small and medium--instead of one, two vegetable lists--3 percent and 6 percent, an allowance for ice cream once a week, and an exclusion of fruits for between meal snacks. The Joslin Clinic has developed these revisions to help their patients make more accurate decisions about food content and to allow some lenience with regards to special treats (Kaufman 1977; Kozak 1977).

Prater (1974) has described a food group system, "Diabetic--Four Plus One," used by the Salt Lake City Diabetes Center. This system has provided a greater variety of foods than the exchange lists and has utilized the terms "choice" rather than "exchange," and "meal plan" rather than "diet." Still another plan, the point system, has been promoted as a simplified method based on three

nutrient groups and one calorie group. The most used
plan of the point system controls the carbohydrate
group and the calorie group. Foods are placed in one
of the four groups and are assigned a point value
determined by composition. Foods to be eaten are then
chosen by their point values to equal the total number
of points allowed per day which is determined by the
number of calories prescribed per day (Stucky 1977).

Most strategies for implementing diets have
stressed tailoring a dietary prescription consistent
with each individual's specific needs and preferences
and educating the patient fully in all aspects of his
personal diet. A less than ideal but well-followed
prescription is generally preferable to an unfeasible
theoretically ideal prescription. Although it is not
crucial for the non-insulin-dependent diabetic's diet
to include meal spacing, extra food for exercise, and
special intake during acute illness, this information
may be pertinent since some diabetics with endogenous
insulin take insulin supplements. Typical diet prescrip-
tions have allowed about 25 percent to 35 percent of
total calories as lunch, 25 percent to 35 percent as
supper, 10 percent to 30 percent as breakfast, and 0
percent to 25 percent as between-meal snacks. Allowances

have been made according to the life style and work
schedule of the patient before setting the meal dis-
tribution scheme. To balance exercise that is not
habitually scheduled, it has been recommended that the
diabetic patient taking insulin supplement his intake
with 10 grams to 15 grams of extra carbohydrate for
each hour of moderate exercise and 20 grams to 30 grams
for each hour of vigorous exercise. If a meal must be
delayed or missed, consumption of 15 grams to 30 grams
of carbohydrate has been suggested to offer protection
against hypoglycemia for one to two hours. During acute
illness or threat of infection, dietary emphasis has
been placed on maintaining caloric and carbohydrate in-
take at approximately 50 grams to 75 grams every six
to eight hours in order to prevent hypoglycemia and
ketosis (West 1977).

Patients that request alcohol in their diets
have been advised to trade fat calories for alcohol
calories--one drink equals 15 grams to 20 grams fat or
3 to 4 fat exchanges. These patients should be cautioned
that although high in calories alcohol lacks nutritional
value, may contain questionable amounts of carbohydrate,
and may produce symptoms that mask hypoglycemia. Special
dietary instructions have been recommended for diabetic

patients who are pregnant or undergoing surgery.
Generally, dietary goals have been to provide adequate
but controlled amounts of calories and nutrients to
supply metabolic needs for fetal development or tissue
healing (West 1977).

To educate the patient fully in the aspects of
his diabetic diet, numerous aids have been developed.
Audiovisual material, programmed learning guides, and
group techniques have allowed for variation from the
lecture approach. When the patient has become involved,
greater learning has occurred (Stucky 1977). To assist
the professional in teaching the exchange list method,
the American Diabetes Association (1977) and the American
Dietetic Association (cited in American Diabetes Associa-
tion 1977) have developed a Professional Guide. Due to
the time and effort required, more physicians have been
utilizing the services of dieticians and nurses specially
trained in dietary counseling to obtain diet histories,
initiate diet education, and maintain follow-up contact
(Arky 1978b).

As knowledge has advanced and new information
has emerged, concepts have changed and dietary recommen-
dations for diabetic patients have undergone continual

evolution and revision. Recent findings that have influenced thinking include the following:

1. Glycolysation of hemoglobin (HbAlc) may be a better marker of diabetic control than hyperglycemia (Koenig, Peterson, and Kilo 1976)

2. Unabsorbable carbohydrates (guar gum, pectin, bran) have decreased amounts of blood glucose, cholesterol, and triglycerides (Jenkins, Leeds, and Gassull 1977; Ostuzzi et al. 1979)

3. Insulin deficiency and hyperglycemia have been accompanied by elevated levels of cholesterol that may contribute to the pathogenesis of the macro-angiopathy of diabetes (Bennion and Grundy 1977)

Compliance

The general concept of compliance is a broad category of diverse behaviors referring to the degree to which an individual adheres to a prescribed medical regimal (Kasl 1974). Zifferblatt (1975) defined compliance as a ". . . class of behaviors occasioned by a specific set of cues (antecedents) and consequences" (p. 176). In the context of this review, the set of cues or antecedent is the recommendation or direction given by a physician or related health professional.

In examining the language used in compliance studies,
Stimson (1974) pointed out that compliance was the
behavior expected of the passive and obedient recipient
of medical instructions. If the patient did not sub-
mit to the behavior prescribed, he was described as a
defaulter, a rejecter, a deviator, uncooperative, dis-
obedient, unreliable, or negligent. Usage of these
terms placed the burden on the patient, implying that
he understood the instructions and willfully chose to
ignore them. Hulka, Kupper, and Cassel (1975) suggested
using the more neutral term "practitioner-patient con-
cordance" implying a shared responsibility toward plan-
ning a therapeutic regimen.

Determinants of Compliance

As previously stated, behavior is occasioned
or determined by cues. A major portion of compliance
research has been designed to identify the cues or
determinants of compliance. Although there are many
studies of compliance, few have studied determinants
in direct relation to the Health Belief Model (Maiman
and Becker 1974) itself. However, the factors they have
examined are closely related to several variables of
the Health Belief Model.

Sackett (1976) found that of 300 compliance related articles reviewed, 185 contained original data concerning compliance. These studies have been divided into six categories: (1) demographic features of the patient, (2) features of the disease, (3) features of the therapeutic regimen, (4) features of the therapeutic source, (5) features of the patient-therapist interaction, and (6) sociobehavioral features of the patient (Haynes 1976).

Demographic features of the patient--age, sex, race, social class, and marital status--have not been found to be consistently related to compliance (Kasl 1974). Isolated studies have shown that decreased levels of compliance are closely associated with family discord (Elling, Whittemore, and Green 1960; Davis 1968a) and living alone, especially in the elderly (Schwartz et al. 1962; Watts 1966; Parks, Brown, and Monck 1972).

Features of the disease include the type of illness, the severity of the illness, the length of time under treatment, and the degree of disability. Based on the review of literature dealing with the objective severity of illness, Marston (1970) stated that there was no consistent association between severity of illness and compliance behavior. In one study, Davis

(1968a) found that patients with serious illnesses were less compliant than those with less severe ailments. Haynes (1976) noted that the type of diagnosis was significant if it was a psychiatric diagnosis. Individuals with a psychiatric diagnosis exhibited less compliance than those individuals with an organic diagnosis, especially those with paranoia schizophrenia.

Several features of the therapeutic regimen have been shown to be consistently related to compliance. The feature found to be most significantly related has been the degree of behavioral change required by the therapeutic regimen. If the medical regimen required adopting a new habit such as taking oral medication, compliance was greater than if the regimen required altering an old habit, such as overworking, overeating, or abuse of drugs or alcohol (Haynes 1976). Complexity or multiplicity of the medical regimen has been positively related to noncompliance. Francis, Korsch, and Morris (1969) reported that compliance was significantly lower in a group of pediatric patients for whom three or more medications were prescribed. Clark and Troop (1972) found that by changing daily medicine doses from multiple tablets to a single tablet they were able to improve the control of hypertension in their subjects. Investigators

such as Clark and Troop (1972) have shown that the
chronicity of the disease and thus the treatment is
directly related to compliance. In a study of tuber-
culosis patients, the incidence of noncompliance in-
creased from 18 percent after one year of treatment to
61 percent after four years (Luntz and Austin 1960).
In another study, the diabetic patients exhibiting the
least compliance were those who had had the disease the
longest (Williams et al. 1967b). Side effects as a
feature of therapeutic regimen have not been shown to
have an important effect on compliance. However, the
feature of cost of the therapeutic regimen has been
shown to have a negative effect on compliance although
there is very little information in this area (Haynes
1976).

One feature of the source of therapy, the
therapist's ability to predict compliance, has been
studied by several investigators (Davis 1966; Caron and
Roth 1968; Moulding, Onstad, and Sbarbaro 1970).
Generally, physicians have underestimated the incidence
of noncompliance in their patients and have been unable
to distinguish between noncomplying patients and com-
plying patients. Davis (1966) has attributed part of
the problem to the physician's ego involvement in the

doctor-patient role. The physician may derive a sense
of accomplishment and status by believing that his
patients accept his authority and follow his advice.
Haynes (1976) has stated that this finding is consistent
with other reports of lack of distinguishing demographic
or disease factors that clearly predict noncompliance.
In other words, physicians have not been able to predict
compliance from easily discernible patient or disease
characteristics. Another feature of the therapeutic
source is the continuity of care afforded to patients.
Compliance was greater in a group of pediatric patients
when they were treated by a family physician who had
cared for them previously rather than by a substitute
or strange physician (Charney et al. 1967). Becker,
Drachman, and Kirscht (1972) found that compliance was
greater in mothers of children with otitis media when
they knew and trusted the physician. Significant find-
ings have also resulted from studies examining the
temporal feature of the therapeutic source.

In a study of patients with rheumatoid arthritis,
Geertsen, Gray, and Ward (1973) found that patients who
say they have been kept waiting for long periods of time
in the clinic tend to be low compliers. Most of the non-
compliers in this study also stated that they needed more

time with the doctor. Prolonged waiting times before and during appointments were also among the variables found to be related to compliance in a group of hypertensive patients (Finnerty, Mattie, and Finnerty 1973).

Features of the patient-therapist interaction have appeared to influence compliance although evidence in this area has been less objective and valid than in the other areas reviewed. Studies of the relationship between the degree of supervision and compliance have indicated that hospitalized patients have been more compliant than day-patients who are more compliant than outpatients (Haynes 1976). The most detailed and analytical work on the physician-patient communication aspect of compliance has been done by Davis (cited in Gillum and Barsky 1974). Patients were less likely to comply (1) if the physician did not provide his patient with feedback after actively seeking information, (2) if tension emerged during a physician-patient interaction and was not resolved, (3) if the physician was formal and rejecting (Davis 1968b). Francis, Korsch, and Morris (1969) have documented that noncompliance was more likely if the patient's expectations in seeking care were not met, if the patient perceived a lack of warmth in the physician, or if the patient failed to receive an explanation

of the illness. In a study of maternity patients and their compliance with post-partum recommendations, Holder (1972) examined compliance in terms of communication characteristics. Focusing on the source of communication, Holder found that a housewife communicator was more effective than a nurse in gaining compliance in immediate post-partum behaviors in the hospital. Holder offered no explanation except that the communication process involved differing perceptions, reactions, races, and professional status.

The last category of compliance determinants, the sociobehavioral features of the patient, overshadows the other categories since the patient is a variable active in every category. The majority of studies has found no association between a patient's knowledge about his disease or its therapy and compliance (Donabedian and Rosenfeld 1964; Vincent 1971; Bille 1977). This finding has been supported by other studies that have found no relation between the intelligence quotient and compliance (Watkins et al. 1967; Tagliacozzo and Ima 1970) or between educational level and compliance (Vincent 1971; Becker, Drachman, and Kirscht 1972). A study of patients with a diagnosis of acute or probable myocardial infarction indicated a significant relationship between a positive body

image and compliance with post hospitalization pre-scriptions (Bille 1977).

The aspect of personality characteristics in relation to compliance has been examined by several investigators. Becker, Drachman, and Kirscht (1972) found that mothers who exhibited more medical compliance were more interested in their children's general health and more concerned about the present illness. Low frustration tolerance (little ability to delay gratification), acting out, and excessive gain from the sick role were found to be more prevalent in the noncompliers in a study of chronic hemodialysis patients and their prescribed diets (Kaplan De-Nour and Czaczkes 1972). Other personality types that have related to medical noncompliance are the persons who harbor hostility toward authority figures, who are immature and compulsive, who are obsessive and believe that "dependence" on a drug may lead to a loss of self-control, and who are paranoid and believe that the medication is an instrument of evil (Komaroff 1976).

Beliefs about health have been structured into a model to explain health-related behavior as has been previously stated. The Health Belief Model is socio-behavioral in nature in that it is based on the

individual's perception of various factors within the health-illness continuum (Haynes 1976). The Health Belief Model section of the review of literature describes its relation to compliance in detail.

Compliance and Therapeutic Regimens

In seeking to understand compliance and its determinants, investigators have studied a variety of therapeutic regimens with which patients have been asked to comply. The regimen most frequently studied has been that of prescribed drug therapy usually in relation to tuberculosis, rheumatic heart fever, and psychiatric disease (Marston 1970; Mitchell 1974). Blackwell (1972) found in his review that 25 percent to 50 percent of all outpatients failed completely to take the prescribed medication. Other studies have described additional variations in noncompliant-drug-taking behavior--taking medication for the wrong reason; taking non-physician prescribed medication; failing to use proper dosage, timing, or sequence; and disregarding incompatibility or interaction warnings (Schwartz et al 1962; Malahy 1966; Stewart and Cluff 1972; Geertsen, Gray, and Ward 1973; Hecht 1974). Focusing on the question of how much adherence is necessary to achieve adequate therapy,

Sackett, Gibson, and Taylor (1975) studied drug compliance in patients with primary hypertension. Utilizing pharmacologic trial techniques, they discovered that their patients had to take 80 percent or more of their medication in order to achieve consistent decreases in blood pressure.

In addition to drug-taking activity, behavior related to appointment keeping has been examined in studies of compliance. Outpatient clinic studies have reported approximately a 15 percent to 20 percent rate of broken appointments with a greater incidence among those patients with lower educations, larger families, or marital discord at home. Sex and age have not been found to be significantly related to appointment breaking, but patients with multiple clinic visits scheduled exhibited higher rates of missed appointments (Greenlick, Freeborn, and Colombo 1972; Hurtado, Greenlick, and Colombo 1973). Glogow (1970) found that the number of broken appointments was greater if the appointment had been scheduled by the secretary rather than by the professional staff in conjunction with educational activities. A study of appointment keeping in a group of hypertensive patients revealed that the treatment dropouts were more likely to be non-white, young, of low

socioeconomic status, less educated, and experiencing
diseases of shorter duration than patients who kept
appointments (Caldwell, Cobb, and Dowling 1970). A
reason that has been given frequently for terminating
treatment is that the patient felt well before therpay
was completed. Investigations of premature termination
of treatment among tuberculosis patients have revealed
a similar situation: the patient was asked to complete
medication and treatment even though he felt well or
cured (Moran, Fairweather, and Morton 1956). Taglia-
cozzo, Ima, and Lashof (1973) observed that chronically
ill outpatients on heavy medication, with special diets
prescribed, who rated doctor-patient communication
favorably, and who had better knowledge about their ill-
ness were less likely to terminate treatment prematurely.

As well as drug-taking and appointment-keeping
behavior, compliance investigators have studied patient
response to recommendations to change life style habits
that are related to chronic illness. Inactivity, smoking,
abuse of alcohol or other drugs, and overeating are prac-
tices that become part of day-to-day life and thus may
be resistant to change. Adjusting and modifying lifelong
eating patterns in compliance with a specific diet pre-
scription has been the basis of therapy for diabetes.

Of the diabetic studies reviewed, few have dealt primarily with dietary compliance (Weinsier et al. 1974; Lenner 1976). Therefore, other diet-oriented literature regarding patients with ulcers, on hemodialysis, and with obesity has been reviewed also.

The Weinsier et al. (1974) study was designed to resolve the effects of diets differing in carbohydrate and fat composition on diabetic control in an outpatient diabetic clinic. Since the outcome of the investigation was wholly dependent on dietary adherence, systemized efforts were utilized to motivate the twenty-three subjects to cooperate. A high level of dietary compliance was achieved over a five-month period accompanied by a 99 percent attendance rate and a 4 percent voluntary dropout rate. Weinsier et al. (1974) attributed the higher than expected levels of compliance to:

> (1) the small, group-oriented learning process,
> (2) frequent intervals of follow-up, (3) feedback
> on laboratory data, (4) individualization of diet
> prescriptions, and (5) family involvement (p. 669).

In Lenner's (1976) study, fifty-three women with a predisposed risk to develop diabetes were advised to improve their food habits and to reduce weight if needed. Eight women began the study with good food habits and normal body weights. Forty-two percent of the remaining

forty-five women were compliant with their diets while 33 percent made good efforts. The successful dieters were found to be more convinced of the medical necessity for changing their food habits and made revisits to the clinic during the year-long study. Most of the women with a weak motivation to change their diet did not feel the need to change because they knew of no relative with diabetes. Lenner (1976) concluded that the motivation to change depended on the patient realizing that she, herself, was responsible for the success or failure of the program.

Caron and Roth (1971) observed dietary adherence in a group of inpatients with peptic ulcer disease. Each of the 206 subjects was given the personal responsibility to use the correct diet card to order his prescribed diet in the hospital cafeteria. The median patient followed his prescribed ulcer diet 76 percent of the time observed, but one-fourth of the patients cooperated less than 60 percent of the time. Caron and Roth also found no relationship between a patient's level of dietary compliance and his degree of compliance with antacid therapy. Kaplan De-Nour and Czaczkes (1972) rated about 45 percent of the hemodialysis patients in their study as abusers of the diet regimen. Dialysis patients felt physically bad if

they disregarded their diets. This result of dietary noncompliance should have served as negative reinforcement and reduced the high incidence of noncompliance. The investigators have attributed this high rate of noncompliance primarily to a high level of aggression and hostility in the patient subsequent to his dependency on dialysis and the loss of control of his life. Kaplan De-Nour and Czaczkes (1972) suggested identification of underlying emotions in order to modify noncompliant dietary behavior.

Similar rationale has suggested that obesity is the result of abnormal eating brought on by some underlying psychic abnormality (Bruch 1973). Psychotherapeutic treatment for obesity has centered on dissecting the obese individual's emotional life and correcting any abnormalities. Evaluation of this therapy has been difficult due to the lack of appropriate control studies. A more promising psychotherapeutic approach has been derived from the behaviorist learning theory of Pavlov and Skinner (cited in Chlouverakis 1975). In behavioral modification, therapists attempt to identify and modify habits contributing to excessive caloric intake and decreased energy output. Obesity has been described as a result of these habits, rather than a symptom of

some hidden psychologic problem (Chlouverakis 1975).
Behavior modification programs based on operant con-
ditioning have been described by Stuart (1967), Harris
(1969), and Blackwell (1973). In these programs,
patients were asked to analyze their eating patterns
and then to assist in designing individual plans of
change. These plans have included specific activities
such as eating in only one place in one room; engaging
in no other activity while eating; making small portions
of food appear larger; slowing the pace of eating by
chewing methodically or changing utensils frequently;
and keeping records of food intake, exercise, and
weight. Stuart (1967) reported that eight of ten obese
individuals treated in the office lost more than 20
pounds and three of those lost more than 40 pounds.
Harris' (1969) controlled study documented similarly
impressive results using related treatment techniques
in a group setting. Although concern has been voiced
about the durability of results (maintenance of weight
loss post-treatment), Blackwell (1973) has claimed
that he has bettered the results of conventional treat-
ment, with weight losses lasting longer than the year
under study.

In a study of the self-help group, Take Off Pounds Sensibly (TOPS), whose techniques are based on principles of behavior modification, Stunkard, Levine, and Fox (1970) compared the weight loss among members of twenty-two chapters with the weight loss documented in fourteen medical reports. Twenty-eight of the 485 TOPS members lost more than 20 pounds, an amount similar to the average weight loss in the medical reports. The most effective TOPS chapter reported 62 percent with a 20 pound weight loss which was better than any of the results shown in the medical literature. Much of the success of the TOPS program has been attributed to the fact that the members regard themselves as intelligent individuals with the power to overcome emotional problems and thus control overeating. Each individual participates in the design of his treatment and evaluates himself in the presence of the group. Group members compete and cooperate both to motivate and support each other. Guggenheim (1977) has encouraged group behavior modification techniques for diet therapy since they have produced greater and longer lasting weight loss than traditional dietary instructions or conventional drug therapy.

Measurement of Compliance

Measurement of compliance relates directly to the type of therapeutic regimen with which an individual has been asked to comply. Feinstein (1976) has described compliance data as "soft" or subjective, lacking scientific appeal in that the evaluation of compliance involves a human being's actions and reports of actions. "Hard" data or objective measurement have been feasible when compliance relates to drug-taking behavior. In such studies, the analysis of urine or blood has been used to detect a drug, its metabolites, or a tracer substance. Geertsen, Gray, and Ward (1973) utilized blood salicylate levels to aid in determining compliance in a group of 123 patients with rheumatoid arthritis. One disadvantage of this method has been that the single specimen test has not indicated clearly whether correct dosages have been taken over the designated period of time. Another measurement technique used objectively to evaluate compliance has been the pill or container count. Caron and Roth (1971) counted empty antacid bottles to determine compliance in a group of hospitalized ulcer patients. Moulding, Onstad, and Sbarbaro (1970) devised a clever medication dispenser using radioactive material and photographic film to record the pattern with which

medication packets were removed, something a simple
pill count could not detect.

Other objective forms of evaluating compliance
have included measurement of body weight, direct obser-
vation of activity, and review of attendance records.
Compliance with weight-loss programs has been measured
by changes in body weight at designated intervals (Len-
ner 1976). Zifferblatt (1975) has designated that
target behaviors should consist of specific measurable
actions to eliminate subjectivity during observation.
Investigators have used direct observation of diabetic
patients in their home settings to evaluate their com-
pliance with insulin administration, urine testing, and
food preparation (Williams et al. 1967a). The simple
review of attendance records has been a good indicator
of compliance since a patient's cooperativeness can be
demonstrated by his willingness to keep appointments.
A record check to determine whether referrals or recom-
mendations for further treatment have been followed has
also been an effective indicator of compliant behavior
(Marston 1970).

In contrast to these objective measurement tech-
niques is evaluation of compliance by patient report.
Feinstein (1976) has suggested that the best way to

measure compliance accurately is to ask the patient
directly. Patient report may be written or verbal,
structured or nonstructured. The written structured
method or questionnaire was used by Geertsen, Gray,
and Ward (1973) when compliance was measured in patients
with rheumatoid arthritis. The verbal structured form
or interview was utilized by Lenner (1976) to measure
dietary compliance in pre-diabetic women. Guggenheim
(1977) indicated that nonstructured measurement or verbal
recall of 24-hour food intake and written diaries of
eating behavior has been useful in determining dietary
compliance in obese individuals. Unfortunately, the
patient report is quite subjective, depending completely
upon the patient's memory and reliability along with the
skill of the interviewer. For this reason, several
investigators have developed composite indices of com-
pliance based on more than one measurement technique.
Utilizing composite indices to combine ratings of com-
pliance to different types of therapeutic regimens into
one score may produce a loss of precision in estimating
compliance (Marston 1970).

Literature concerning measurement techniques of
compliance has identified two factors that may result
in inaccurate data collection and conclusions. Meyer and

Henderson (1974) have described the "attention-placebo" effect as a phenomenon that may occur because of the increased attention that the patient receives as a subject in a study. Compliance may occur in response to the process of being treated rather than in response to the treatment itself. Feinstein (1976) has discussed thoroughly the issue of compliance bias and the errors it can produce in the biostatistical analysis of compliance data. Feinstein has firmly stated that investigators should restore attention to a traditional method of data collection: verbal exchange. By limiting the focus to hard data only, investigators have neglected the attitudinal factors distinguishing human research from animal research.

Interventions to Improve Compliance

Becker (cited in Facets of Compliance 1976) has pointed out that sociodemographic variables of compliance are generally "not intervenable." Intervention should, therefore, be focused on

> . . . the patient's . . . health-related motivations, attitudes, and beliefs as well as aspects of the setting and the patient-practitioner relationship (Facets of Compliance 1976, p. 139).

Attitudes, beliefs, and lack of knowledge have been
more influenced by an educational approach while per-
sonality characteristics have been better directed by
accommodative strategies (Gillum and Barsky 1974).

Blackwell (1973) has included patient education
and strategy planning in his recommendations for improv-
ing compliance, but has suggested that the first step is
to identify which patients are "at-risk" patients. Use
of the compliance-oriented history has been advocated as
a means of predicting which patients may be poor com-
pliers. Matthews and Hingson (1977) have suggested
specific questions designed to explore patients' per-
ceptions about their illness and its treatment plan.
Besides collecting valuable information, this type of
questioning has communicated to the patient that the
physician cares about the patient's own perceptions.
Once the "at-risk" patient has been identified, specific
interventions to prevent or improve noncompliance can
follow.

Patient education has been shown to be a crucial
intervention for improving compliance. The patient
should have a clear understanding of the illness, the
treatment, and probable effects of both (Blackwell 1973).
Hecht (1974) demonstrated that improvement in the accuracy

with which outpatients took their medications increased as amounts of teaching by nurses increased. Improvement in drug-taking behavior has been noted also when the physician fully discussed the specific purpose and function of the prescribed medication with the patient (Hulka, Kupper, and Cassel 1976). Matthews and Hingson (1977) have suggested that certain erroneous beliefs held by the patient may be reshaped by pointing out distinct inconsistencies in their belief structure or by appealing to resources of information in which the patient may have established trust. Social pressure and support through the use of patient-education groups of problem-oriented groups may also promote compliance. Whatever the specific technique, the educational process should provide opportunity for active participation and should be repeated regularly (Gillum and Barsky 1974).

Just as the patient should actively participate in his educational process, he should participate also in the third phase of compliance intervention--strategy or treatment planning. Gillum and Barsky (1973) have described the process of prescribing therapy as a process of negotiating a series of trade-offs of behavior in exchange for promised benefits. Zifferblatt (1975) has

emphasized the importance of "tailoring" the process
of fitting treatment into a patient's existing routine,
to make the therapeutic regimen as tolerable, convenient,
and self-directed as possible.

A group of hypertensive patients who were in-
volved in decision-making to tailor their individual
therapeutic regimens was also given the responsibility
of monitoring their own blood pressures at home. This
group had twice the number of compliers than the control
group who did not participate in their treatment planning
(Haynes, Gibson, and Hackett 1976). Ryan (1979) has
noted there was better compliance to insulin adjustment
in a group of diabetics who tested their own blood for
glucose at home. The majority of the patients stated
that they preferred to continue the blood testing rather
than return to relying solely on urine testing.

Further interventions to improve compliance that
revolves around simplification of the regimen itself
have been suggested by various investigators. Matthews
and Hingson (1977) have suggested minimizing the amount
and number of drugs a patient must take by using inject-
able, long-acting medication or oral medications requir-
ing once-a-day administration and by avoiding routine
prescription of vitamins, laxatives, and tranquilizers.

Use of generic drugs to reduce costs and complete label-
ing of instructions has helped to increase compliance.
When a therapeutic regimen has required an involved
behavior change, compliance has been increased by re-
commending gradual or step-by-step changes rather than
demanding total change-overs all at once.

Vincent (1971) has investigated the role of the
nurse in improving compliance in patients with glaucoma.
Rather than simply offering more information, Vincent has
advocated assisting the patient to define his sick role-
normal role conflict. While clarifying the conflict,
the nurse can evaluate what kinds of information would
be most relevant and meaningful for the patient. Each
patient is a distinct product of interacting variables
necessitating individualized strategies to improve com-
pliance: no technique is universally effective (Ziffer-
blatt 1977).

Health Beliefs

The Health Belief Model is a symbolic representa-
tion which attempts to explain and predict man's accep-
tance of health and medical care recommendations. The
Model evolved from a set of independent, applied research
problem which confronted investigators in the United

States Public Health Service between 1950 and 1960.
"The theory and development of the Model grew simul-
taneously with the solution of practical problems"
(Rosenstock 1974, p. 1).

The Health Belief Model and Preventive Health Practices

Research related to the Health Belief Model
originated in 1952 when Hochbaum (1958) studied more
than 1,200 adults and their decisions to obtain chest
x-rays for detection of tuberculosis. The factors in-
fluencing the decision to have a chest film made were
beliefs in susceptibility to tuberculosis and beliefs
in the benefits of early diagnosis. Four out of five
people who held both beliefs had had at least one
voluntary chest x-ray during a specified time prior to
the interview. In contrast, four out of five people
who reflected neither of the beliefs had not taken the
voluntary action. In this study, Hochbaum seems to have
shown decidedly that a specific health-oriented action
is a function of the interacting variables of perceived
susceptibility and perceived benefits (Hochbaum 1958).

In another early study, Kegeles (1963a) analyzed
factors that influenced preventive dental check-ups in

430 members of a prepaid dental care plan. Kegeles (1963a) measured perceived susceptibility to dental disease, perceived severity of this disease, and beliefs about benefits of and barriers to preventive dental actions. Attrition greatly affected the generalizability of his study but seventy-seven subjects completing the study demonstrated that as the number of beliefs exhibited increased from zero to three, so also did the frequency of making preventive dental visits increase.

Two other investigators, Flach (1960) and Heinzelman (1962) showed evidence supporting the Health Belief Model in relation to cervical cancer and rheumatic fever, although the samples were not large in number. These four original studies have provided reasonable support for the model even though not one individually confirmed all the model variables (Rosenstock 1974). In that these studies are retrospective, they have examined existing belief and prior or pre-existent behavior at the same point in time. This approach has made it difficult to determine whether the behavior or activity may have in itself modified perceptions or beliefs rather than the beliefs having modified behavior (Rosenstock 1974).

Two prospective studies investigated health beliefs and related behavior at different times.

Leventhal, Hochbaum, and Rosenstock (1960) examined the impact of the threat of Asian influenza on American families living in cities. The subjects were interviewed before most people had the opportunity to obtain influenza vaccinations. The second interview occurred after the threat of the epidemic had subsided. The vaccination program and spread of the epidemic proceeded so quickly that the sample size was reduced from 200 to 86. Statistical analysis of the limited data did suggest that prior beliefs in susceptibility and severity did relate to subsequent action.

The second prospective study was one conducted by Kegeles (1963b) three years following his initial collection of data reported earlier. By mailing a questionnaire to each person in the original sample, he set out to determine whether the beliefs identified during the original study were associated with behavior occurring in the subsequent three-year period. Results of the survey demonstrated that perceptions of seriousness and perceptions of benefits were not associated with subsequent behavior when considered alone. The perception of susceptibility was correlated with making preventive dental visits. In combination, susceptibility and benefits

provided a more accurate prediction of whether or not preventive dental visits would be made.

Contrary to the findings in the preceding studies, a national survey of health beliefs conducted in 1963 revealed that the respondents' preventive and diagnostic behaviors could not be attributed to their perceptions of susceptibility, severity, and benefits (Kirscht et al. 1966). A sample of 1,493 adults was interviewed about their beliefs in regard to dental disease, cancer, and tuberculosis. Half of these individuals were studied fifteen months later to determine their activity in regard to dental and cancer check-ups and x-rays for tuberculosis. Although the study did not offer an explanation as to why its findings were dissimilar to those of earlier studies, Rosenstock (1974) pointed out that the national study was conducted in a setting completely different from the other studies. In prior studies, the populations had been given information regarding the availability of diagnostic procedures and had been encouraged to obtain these procedures. The sample in the contrasting study had not been influenced by intensive campaigns to inform them of the necessity and availability of such procedures. According to Rosenstock (1974), lack of cues to act and unequal opportunity

to act may have contributed greatly to the findings con-
flicting with those of earlier studies.

Haefner and Kirscht (1970) used more innovative
techniques in their study which further explained the
relationships between Health Belief Model variables and
actual health behavior. One hundred and sixty-six non-
academic university employees were shown three films
stressing regular check-ups for cancer, heart disease,
and tuberculosis. The findings demonstrated the possi-
bility of modifying beliefs concerning susceptibility
to certain conditions and concerning effectiveness of
various preventive or therapeutic actions. Those sub-
jects with changes in beliefs indicated greater inten-
tions to taking pertinent health-related actions.
Generally, those who indicated greater intentions
subsequently followed through with more health-related
actions. In other words, the study demonstrated that
perceptions of susceptibility to and severity of disease
and perceptions of efficacy of treatment could be modi-
fied, and that through such modifications, predictable
changes in health behavior could occur. The investigators
pointed out that whether or not an individual took a
specific action depended greatly upon the nature of the
action itself. For instance, more subjects indicated a

motivation toward obtaining a check-up for disease prevention rather than toward changing dietary patterns or other life-long habits.

> Altering one's beliefs about health may be sufficient to change actions that are largely motivated by health matters but will usually be insufficient to alter behaviors that simultaneously satisfy a variety of motives (Haefner and Kirscht 1970, p. 483).

Another innovative study was that of Becker et al. (1975) dealing with the application of the Health Belief Model to the area of genetic screening for Tay-Sachs trait, a condition common in Jewish individuals. Beginning in 1971, a Jewish population in Maryland was invited to participate in an education and screening program to detect couples with a risk of birthing a child with Tay-Sachs Disease (TSD). Since the disease is fatal in early childhood and amniocentesis can detect its presence, conditions were present for observing the activity of preventive health behavior in terms of the Health Belief Model. Also, due to the relative rarity of the disease, most individuals had had few preconceived beliefs about it. In this investigation, health motive was introduced as an explanatory variable of health behavior and was measured by the desire to have additional children and by certain responses to general questions

concerning personal health concerns. Approximately 7,000 adults were educated, screened, and questioned. From this number, a random sample of 500 individuals was chosen to compare to a group of 500 individuals who did not respond to the invitation for screening.

Results showed that the individuals participating in screening believed in their unborn children's susceptibility to Tay-Sachs Disease, while fewer of the non-participants believed that they were susceptible. The participants demonstrated a low perceived severity by stating that learning that they were carriers would not affect their subsequent family planning. Non-participants stated that learning that they were carriers would seriously affect their family planning, thus demonstrating a high perceived severity. Both groups demonstrated high perceived benefits by equally favoring abortion if Tay-Sachs Disease was diagnosed in the fetus. Becker et al. (1975) believed that the nature of Tay-Sachs Disease produced so great a level of perceived severity as to become dysfunctional. The investigators stressed the need for further studies measuring degrees of variation in the variables explaining health behavior in order to define the optimal balance needed to promote positive health behavior (Becker et al. 1975).

Several investigators have studied preventive
health behavior dealing with separate components of the
Health Belief Model rather than the whole model as part
of their design. Of particular interest is the study
of Antonovsky and Kats (1970) regarding health behavior
of 500 employees of the Hadassah Medical Organization in
Jerusalem. In their report, Antonovsky and Kats pointed
out three differences between their model and the Health
Belief Model. Their criticism of the concept of "cues"
in the Health Belief Model was based on their opinion
that an individual who is otherwise ready to take action
may "create his own cues" (Antonovsky and Kats 1970, p.
380). They also criticized the omission of a motiva-
tional concept in the early Health Belief Model. For
Antonovsky and Kats, motivation meant goal-oriented
behavior with the most relevant goal being that of main-
taining health. As previously noted, Becker (1974)
expanded the variables in the original Health Belief
Model to include such a motivational variable. Lastly,
Antonovsky and Kats contrasted other studies by intro-
ducing the concept of threshold level rather than a
linear, monotonic relationship between a specific vari-
able and preventive health behavior. They suggested
that for each variable there might be cut-off points in

each individual below which that variable would have no effect and above which it would have effect. Difficulties in measuring the variables have complicated the testing of this hypothesis (Antonovsky and Kats 1970).

The Health Belief Model and Illness Behavior

Although the original Health Belief Model was designed to explain preventive health behavior, its components may apply also to "illness behavior" or to persons experiencing disease symptoms. Original investigators in this area were Kasl and Cobb (1966) who described illness behavior as dependent on the degree of threat produced by symptoms in each individual. Becker and Maiman (1975) have adapted the model's formulation to sick role behaviors, or to persons already diagnosed as ill, specifically in the area of taking prescribed medications. Haefner (1974) has reviewed the Health Belief Model's relevance to preventive dental behavior, while Kasl (1974) has examined the Health Belief Model in relation to chronic illness behavior. For Kasl's (1974) purposes, he defined behavior related to chronic illness as the following:

1. Seeking medical attention in the presence of symptoms, especially referral behavior and delay

   2.   Compliance with medical regimen
   3.   Staying in treatment
   4.   Modification of life style habits to
reduce risk (p. 106).

Kasl (1974) stated that his consideration of
chronic illness behavior was not comprehensive; it did
not include sick role behavior of hospitalized patients.
Distinguishing the three terms "health," "illness," and
"sick role" behaviors, Kasl explained that health be-
havior existed prior to the occurrence of symptoms while
illness behavior occurred while symptoms were active.
Sick role was distinct in that it usually involved longer
contact with a health professional or treatment setting.
Kasl had difficulty utilizing these concepts in describ-
ing chronic illness since they did not specifically
include the areas of risk-reduction and health-mainte-
nance. The chronically ill individual did not clearly
fit into the traditional sick role because (1) he might
feel well despite the risk factors present and because
(2) he had to comply with some treatment regimen indefi-
nitely to reduce a risk which might or might not have
created noticeable changes. The treatment regimen could
involve modifying personal habits rather than following
more medically oriented recommendations which could reduce
the authority of the health professional below that

present in the traditional doctor-sick patient relation-
ship (Kasl 1974). Baric (1969) described the "at-risk"
role as (1) non-institutionalized, (2) requiring duties
but no privileges such as reduced social responsibili-
ties, (3) lasting for an indefinite time period, (4)
lacking continuous professional and social reinforcement,
(5) lacking feedback supplied by changes in symptoms or
treatment procedures.

The effect of the presence of symptoms on an
individual's readiness to seek medical help has been
reported in several studies (Battistella 1968; Smith and
Kane 1970; Banks and Keller 1971; Bellin and Geiger 1972).
Although these studies made no specific reference to the
Health Belief Model, they did examine concepts closely
related to the model's variable of perceived seriousness.
Pertinent findings have shown that the more accessible
health care services were, the more inclined an indi-
vidual was to seek attention regarding a particular symp-
tom. Also the more accurate the individual's knowledge
of symptoms and disease, the more likely he was to seek
attention. On the other hand, the more familiar he was
with a symptom, the less likely he was to seek attention.
The latter might have been the case if the individual or

significant other had previously experienced the symptom (Kasl 1974).

The situation in which an individual was not experiencing symptomology but in which an unknown condition was detected upon screening or routine examination presented another setting for studying medical help-seeking. Individuals undergoing cardiovascular screening examinations have been observed for their health activity following recommendation to obtain further professional treatment (Wilber and Barrow 1972; Khoury 1973; Charman 1974). Although these studies did not refer to the Health Belief Model variables explicitly, the decision to follow through on a referral was found to be related to the individual's perception of the severity of the condition (Kasl 1974).

Another setting for studying medical help-seeking was the situation in which an individual experienced symptoms but delayed getting professional help. Delay in seeking medical attention corresponded frequently with symptoms indicative of cancer (Kegeles 1973; Antonovsky and Hartman 1974; Green and Roberts 1974). Zola (1973) summarized this behavior: ". . . there is something about these people or in their backgrounds which has disturbed their rationality, for otherwise, they

would 'naturally' seek aid" (Zola 1973, p. 689). In
this situation of high perceived threat (susceptibility
and seriousness) and low perceived efficacy, Kasl (1974)
suggested that the Health Belief Model might not be as
applicable as a more complex decision-making approach
with more emphasis on coping and defense.

In discussing further the weaknesses of the
Health Belief Model in relation to chronic illness be-
havior, Kasl (1974) listed three relevant variables
that are not represented adequately in the present model:

    1. The social environment (lay referral and
social support)
    2. The doctor-patient interaction
    3. Perception of symptoms and lay construc-
tions of illness and the sick role (p. 120).

Lay referral, or the process of consulting significant
others about what should be done in regard to one's
symptoms, appeared to be a contributing factor in
determining one's health-illness behavior. The doctor-
patient relationship involved the patient's perceptions
of the technical competence of the physician and the
interest he had taken in the patient. The concept of
lay constructions involved the area of expectations and
perceptions of symptoms, health, illness, and sick-role
which were determined by one's sociocultural environment.
Kasl (1974) contended that these areas must be

theoretically and empirically integrated into a reformu-
lated Health Belief Model in order to describe more
accurately chronic illness behavior.

Summary

Chapter II has presented a review of literature
on diabetic diets, compliance behavior, and health be-
liefs. Most adults with diabetes are obese and have a
resistance to the actions of insulin. Recommended diet
therapy for these individuals is the control or reduc-
tion of the total caloric intake to achieve desired
body weight. Carbohydrate, protein, and fat content
is determined by the patient's individual needs. The
"exchange list" or other methods can be effective diet
teaching tools if the instruction is individualized,
repeated, and evaluated frequently (Arky 1978b).

When the patient is educated in the cognitive
aspects of his diet, he can make informed decisions
regarding his behavior. A behavioral aspect of diet
therapy is compliance, the degree to which the individual
adheres to the prescribed regimen (Kasl 1974). A major
portion of compliance research has been designed to
identify determinants of compliance. The complexity
and duration of the therapeutic regimen, the degree of

change required by the regimen, the quality of the patient-therapist interaction, a past history of compliance, family stability, and appropriate health beliefs have been associated most often with compliant behavior (Haynes 1976).

The Health Belief Model has been developed to explain the relationship between an individual's beliefs and his actions in regard to health-illness practices. This sociobehavioral model depicts compliance as most related to these variables according to Becker and Maiman (1975):

1. Perceptions of disease severity
2. Perceptions of susceptibility to disease
3. Perceptions of benefits of treatment
4. Perceptions of cost of treatment
5. Perceptions of doctor-patient relationship
6. Health-related motivations (cues to action)
7. Social influence

The predictive value of the Health Belief Model has been supported and with more research will improve. By using a predictive tool, weak variables can be identified and modified in order to provide optimal conditions for compliance, thus upgrading the patient's quality of care (Becker and Maiman 1975).

CHAPTER III

PROCEDURE FOR COLLECTION AND
TREATMENT OF DATA

Scientific research has been defined as "system-
atic, controlled, empirical, and critical investigation
of hypothetical propositions about the presumed relations
among natural phenomena" (Kerlinger 1973, p. 11). This
study investigated the relationship between two variables:
health beliefs and dietary compliance. This investiga-
tion attempted to describe and explain characteristics and
relationships between the variables using survey research.
Survey research is that type of research activity that
focuses on the status quo of a situation and collects
information about this situation from members of the group
being studied. In that neither variable was manipulated
by the investigator the research was ex post facto in
nature (Polit and Hungler 1978).

Setting

The setting for this study was a family practice
clinic in a town with a population of 100,000 in the
southwestern region of the United States. The clinic was
established in 1970 to give comprehensive care to county

residents, utilizing the diagnostic facilities of an adjacent private hospital. Funded by the city, the county, two private hospitals, the county medical society, and a grant from the Department of Health, Education and Welfare, the clinic has more than 2,500 families registered. Nineteen residents function under the supervision of faculty physicians assisted by three nurse practitioners, five nurses, a pharmacist, a dietician, and a social worker.

Population and Sample

The population for this study was comprised of all the non-insulin-dependent diabetic patients registered in the clinic facility. The study sample was limited to non-insulin dependent, adult-onset diabetics, included only those individuals with primary diabetes, and included only those diabetics who were medically compliant according to their physician. The non-probability sample was selected from the population by means of convenience sampling. Polit and Hungler (1978) have described the sample of convenience as one consisting of the most readily available individuals for use as subjects in a study. Subjects were selected as they appeared for appointments scheduled between

9:00 A.M. and 3:00 P.M. on each day during the two-week period designated for data collection.

Protection of Human Subjects

Permission to conduct the study was granted by the Texas Woman's University Human Subjects Review Committee (Appendix A) and the participating agency (Appendix B) prior to its initiation. Each subject received from the researcher a written explanation of the study (Appendix C) describing its purpose, the risks and benefits involved, and the method used to protect anonymity and to insure confidentiality. After being given the opportunity to ask any further questions regarding the study, the consenting subject was asked to sign an informed consent form (Appendix D). In this form, the subject agreed to participate in the study and confirmed that he understood the purpose, risks, benefits, and personal implications of the study. In order to minimize embarrassment, the interview was conducted in a private area. Anonymity was insured by using a code number on each interview schedule which matched the data obtained from the subject's medical record. Once the two sets of data were matched, individual names were discarded. Each subject was

informed that he could discontinue the interview at any time.

Instruments

The tool used to assess health beliefs in this study originated from a tool developed and utilized by the researcher in a nursing diagnosis project in 1978. At that time, the questionnaire was administered verbally to three patients and has since been revised to include more items such as those included in the McMaster University Standardized Compliance Questionnaire (Sackett et al. 1976). Permission for use and revision of this questionnaire was obtained (Appendix E).

Although the McMaster tool was too lengthy and no documentation of its reliability and validity could be found, its general format was useful in revising the nursing diagnosis tool. Items in the revised questionnaire represented the following variables associated with compliance according to Sackett et al. (1976):

1. Knowledge of diabetes and diet therapy

2. Perception of the patient-clinician interaction

3. General health motivation

4. Perception of severity of and susceptibility to diabetes

5. Perception of efficacy of and barriers to treatment

6. Cues to action

As suggested by Kerlinger (1973), the tool included open-end, closed-end, and scale items. Also included were items to obtain pertinent demographic data. The Health Belief Tool is shown in Appendix F. A panel of four experts in fields related to the study assessed the tool for clarity of expression and content validity (Appendix G). Although they suggested that some form of reliability be established for the Health Belief Tool, the panel agreed that the tool was generally more valid than invalid.

A second tool also developed by the researcher was used to measure the degree to which each subject's diabetes was controlled. For the purpose of this study, control indicated compliance. The tool consisted of the following items generally considered as criteria for good diabetic control:

1. Normoglycemia--fasting blood sugar (FBS)

2. Normal body weight--as described by the Metropolitan Life Insurance Company

3. Good health--no major complications (Crampton 1966)

Use of this tool in the 1978 nursing diagnosis project indicated that another item should have been included to measure medication variations. Added to the other criteria, this information allowed further assessment of the individual who had achieved normoglycemia and normal weight by using medication. The following item indicated good control:

4. Diabetic medication--(a) none, (b) oral hypoglycemic, or (c) insulin dosage stable and below 30 units per day (Haunz 1973).

The Dietary Compliance Tool is shown in Appendix H. Two clinic staff members on the panel of experts who evaluated the tools suggested that the values for normoglycemia be increased to the 140-160 mg/100ml level considered indicative of adequate control by the clinic medical staff. Therefore, the following two sets of criteria were used to evaluate blood glucose levels on the Dietary Compliance Tool:

1. Criteria A--FBS = 80-120 mg/100ml

2. Criteria B--FBS $\leq$ 140 mg/100ml

Data Collection

One set of data was collected utilizing the structured interview method. The interview was

conducted, when possible, in an examination room while the subject was waiting to be seen by the physician. The subjects were interviewed according to their arrival times. Prior to verbal administration of the Health Belief Tool, each subject met the interviewer, received verbal instructions, and signed the consent form. The researcher conducted each interview one at a time, taking approximately twenty to thirty minutes with each subject.

The second set of data was collected utilizing a medical record review to obtain information designated on the Dietary Compliance Tool. Chart information was reviewed at three-month intervals for a period of six months prior to the date of the interview. When information was not available within this time frame, the most recent information was recorded to provide the appropriate amount of data for the Dietary Compliance Tool.

Treatment of Data

Each item on the Health Belief Tool had either a positive or negative response. The score on this tool was determined by the ratio of positive responses to the total number of responses and expressed as a percentage value. The score on the Dietary Compliance Tool was determined by the number of points indicating good control or compliance on a scale of zero to ten.

Descriptive statistics were used to summarize demographic data and report general tendencies on certain items on both tools. The inferential statistical test used to correlate the scores on the Health Belief Tool with the scores on the Dietary Compliance Tool was Pearson's product moment correlation coefficient, applied at the .05 level of significance. This statistical test has been recommended for correlating variables that have been measured on an interval or ratio scale (Polit and Hungler 1978).

CHAPTER IV

ANALYSIS OF DATA

An explanatory survey was conducted to determine the correlation between the health beliefs and dietary compliance in adult diabetic patients. This chapter presents an analysis of data collected by a structured interview and by a medical record review. Thirty non-insulin-dependent diabetic patients in an outpatient clinic participated as subjects in the study. Findings from the interview are expressed in terms of the percentage of positive perceptions indicated and from the chart review as the number of points indicating diabetic control or compliance.

Description of the Sample

The sample consisted of thirty non-insulin-dependent diabetic patients in a family practice outpatient clinic. Demographic data were the sex, race, age, marital status, number of individuals living with the subject, number of years as a diabetic, and number of diabetes-related hospitalizations. Male patients comprised 20 percent and female patients comprised

80 percent of the sample. Twenty-seven percent of the sample was Caucasian (white), 50 percent was Negro (black) and 23 percent was Spanish-American. Ages of the subjects ranged from 41 years to 81 years with a mean and median of 60 years and modes of 65 and 67 years (three subjects each). Forty-six percent of the subjects were 60 to 70 years of age. Married subjects comprised 57 percent of the sample with 10 percent separated, 10 percent divorced, and 23 percent widowed. Subjects living alone comprised 20 percent and subjects living with one other individual comprised 53 percent of the sample. Subjects living with two to five individuals comprised 20 percent and subjects living with six or more other individuals comprised 7 percent of the sample. Twenty-seven percent of the sample had been diabetic patients for less than 18 months, 30 percent had been diabetic for 18 months to 9 years, 23 percent had been diabetic for 9 to 20 years, and 20 percent had been diabetic for 20 or more years. Sixty percent of the sample had never been hospitalized primarily for diabetes-related treatment, 24 percent had been hospitalized once, 13 percent had been hospitalized twice, and 3 percent had been hospitalized three or more times. Table 1 describes the demographic data of the sample in percentages.

TABLE 1

DEMOGRAPHIC DATA BY PERCENTAGES

	Sex	Race	Age	Marital Status	Living Companions	Diabetic Years	Times in Hospital
Male	20						
Female	80						
White		27					
Black		50					
Spanish		23					
0-50 years			10				
50-60 years			37				
60-70 years			46				
70 or more years			7				
Married				57			
Separated				10			
Divorced				10			
Widowed				23			
Living alone					20		
1 other person					53		
2-5 others					20		
6 or more others					7		
0-18 mo.						27	
18 mo. - 9 yr.						30	
9 yr. - 20 yr.						23	
20 or more yrs.						20	
No hospitalizations							60
1 "							24
2 "							13
3 or more "							3

Findings

The null hypothesis was stated: There is no significant relationship between a diabetic patient's general health beliefs and his compliance with dietary therapy. The statistical technique used to test the null hypothesis was Pearson's product moment correlation coefficient for significance (r). Figure 1 presents the distribution of cross tabulated scores from the Health Belief Tool and the Dietary Compliance Tool.

Using the Health Belief Tool scores and the Dietary Compliance Tool scores (Criteria A), the computation of this test yielded a r = .28. The critical value of the correlation coefficient at the .05 level of significance with df = 28 was approximately r = .36. Since the absolute value of the calculated r was .28, the relationship between the scores was not significant. The computation of the correlation coefficient using Criteria B for the Dietary Compliance Tool scores yielded r = .29, which also was below the critical value of r = .36, determining that the relationship between these scores was not significant.

Therefore, the null hypothesis that there is no significant relationship between a diabetic patient's general health beliefs and his dietary compliance was

Health Belief Tool Scores by Percent

Dietary Compliance Tool Scores by Points

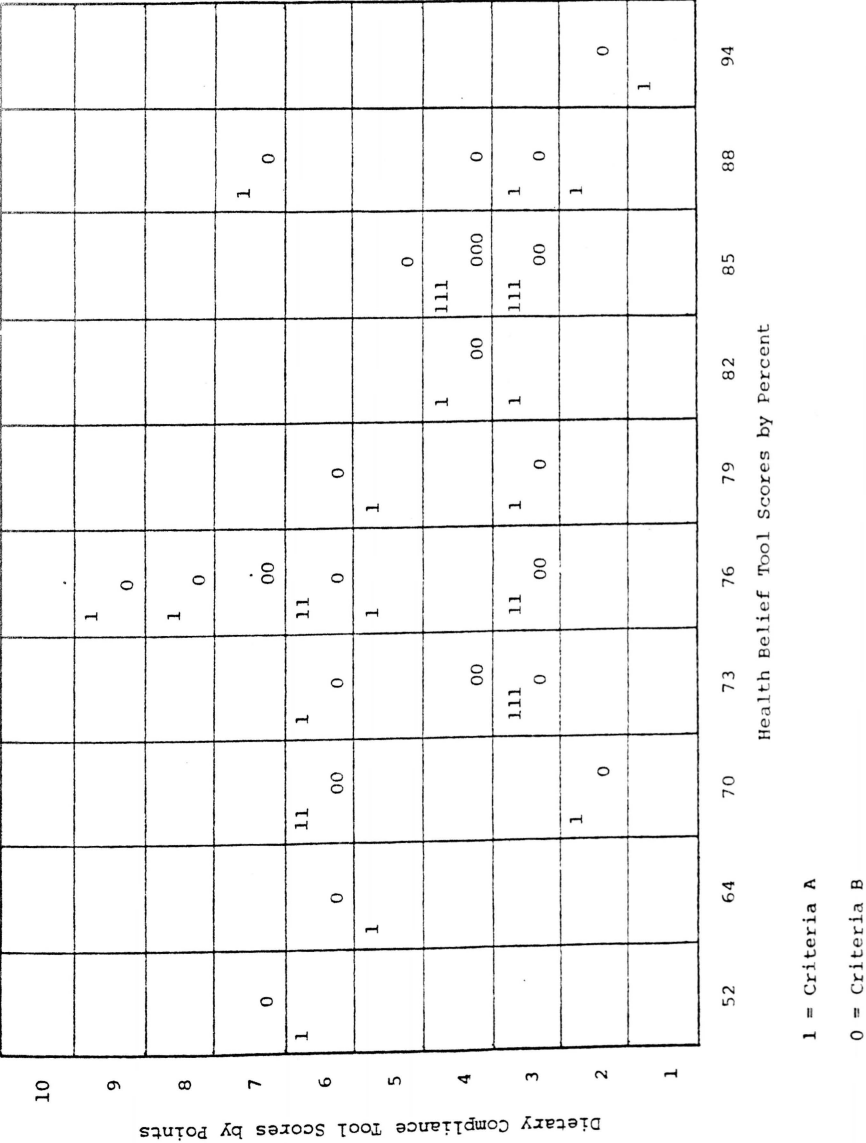1 = Criteria A

0 = Criteria B

Figure 1.   The distribution of cross tabulated scores from the two tools.

accepted. Accepting the null hypothesis implies that there is not enough evidence to reject the null hypothesis (Polit and Hungler 1978). The inference for the sample in this study is that there is not enough evidence to deny that there is no significant relationship between a diabetic patient's general health beliefs and his compliance with dietary therapy.

Additional Findings--The Tools

Health Belief Tool

A Health Belief Tool was developed by the investigator and utilized as an interview schedule to determine the health beliefs of the sample. The major purpose of this tool was to provide a health belief score to correlate with a dietary compliance score. An analysis of the most frequently offered responses for certain interview items indicated possible general tendencies in the sample.

The Health Belief Tool score is expressed as a percentage, the ratio of positive responses chosen by a subject compared to the thirty-three possible positive responses. Scores ranged from 52 percent to 94 percent positive responses with a mode and median score of 76 percent and a mean score of 78 percent. Seventy percent

of the sample chose more than 75 percent positive responses. Figure 2 illustrates the bimodal distribution of scores on the Health Belief Tool.

Some items evoked more frequent responses from the subjects than others did. Seventy-seven percent of the subjects chose a non-positive response to Item 1 measuring their knowledge of diabetes. Fifty-seven percent chose a non-positive response to Item 2 measuring their understanding of diabetic treatment. All of the items related to doctor-patient interaction (Items 7 through 12) were answered with positive responses by more than 75 percent of the sample. Ninety percent of the sample indicated a positive response for Item 16, indicating a belief in prevention of illness. Items 22, 23, and 24 measuring perception of severity of diabetes evoked positive responses in over 70 percent of the sample. Ninety-seven percent of the sample indicated a positive belief in their susceptibility to diabetic complications (Item 25) while 100 percent agreed with the positive perception that diabetes would be controlled by proper eating (Item 27). Eighty percent of the subjects expressed positive responses to Item 35 dealing with their communication with other diabetics. Figure 3 presents the frequency of positive responses on each
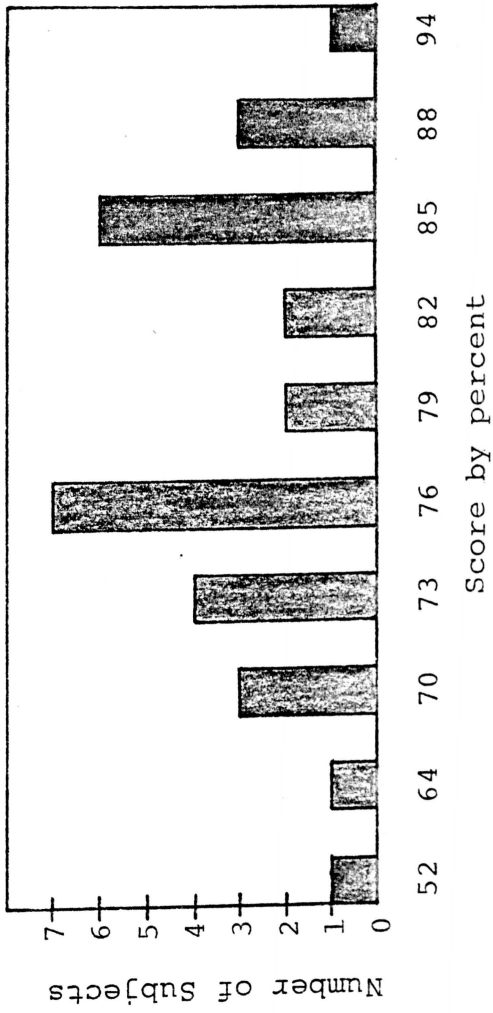
88

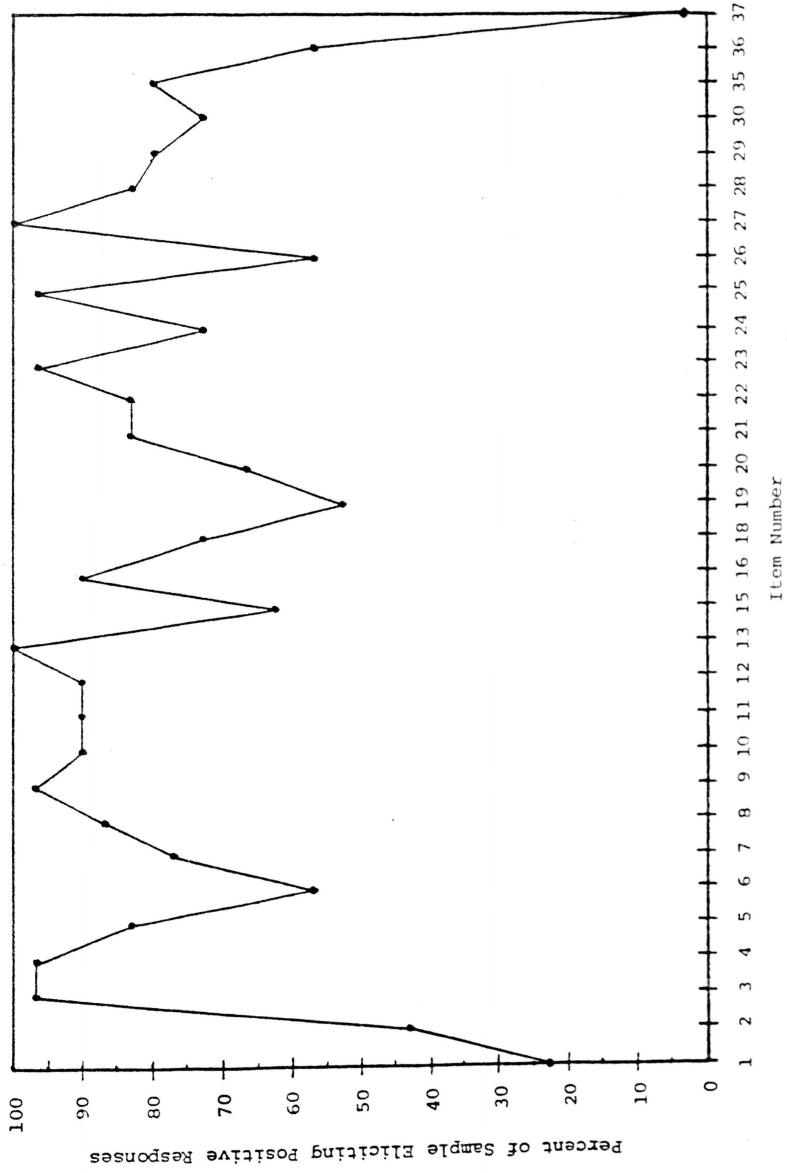Figure 2. Distribution of scores on Health Belief Tool.

Figure 3. Frequency of positive responses on Health
Belief Tool items.

scored item of the Health Belief Tool. Items 14, 17, and 31 through 34 were not included since scoring difficulties occurred with these items.

Dietary Compliance Tool

A Dietary Compliance Tool was developed by the investigator and utilized during a medical record review to group and categorize data indicating the patient's degree of diabetic control. For the purpose of this study, diabetic control indicated compliance. The purpose of this tool was to provide a dietary compliance score to correlate with the health belief score. An analysis of the most frequently occurring data indicated possible general tendencies in the sample. The Dietary Compliance Tool score is expressed as an ordinal number with a score of ten indicating the greatest degree of dietary compliance measurable.

Two sets of criteria were used to score Item 1, the fasting blood sugar (FBS). Criteria A designated that the normal FBS was 80-120 mg/100ml and Criteria B designated that the normal FBS was no greater than 140 mg/100ml. Criteria A was consistent with values described in the literature (Crampton 1966; Luckman and Sorenson 1974). Criteria B was consistent with the values

used as normals by the clinic in this study. Forty-three percent of the dietary compliance scores were higher by 1 or 2 points using Criteria B as compared to Criteria A. The dietary compliance scores ranged from 1 to 9 points with a mode of 3, a median of 4, and a mean of 4.3 using Criteria A. The scores ranged from 2 to 9 points with a mode and a median of 4 and a mean of 4.8 using Criteria B. Eighty percent of the sample by Criteria A and 73 percent of the sample by Criteria B scored 3 through 6 points on the Dietary Compliance Tool. Figure 4 illustrates the distribution of dietary compliance scores by points for both sets of criteria.

Some data occurred more frequently than other data on the Dietary Compliance Tool. By Criteria A, 60 percent of the sample showed above-normal fasting blood glucose values on the tool. Seventy percent of the sample presented above-normal weight measures. Sixty percent of the non-insulin-dependent sample was on insulin therapy while only 13 percent was attempting to control their diabetes with diet therapy alone. Eighty-seven percent of the sample had required no hospitalizations for diabetes treatment in the past six months. Figure 5 shows the frequency of data by
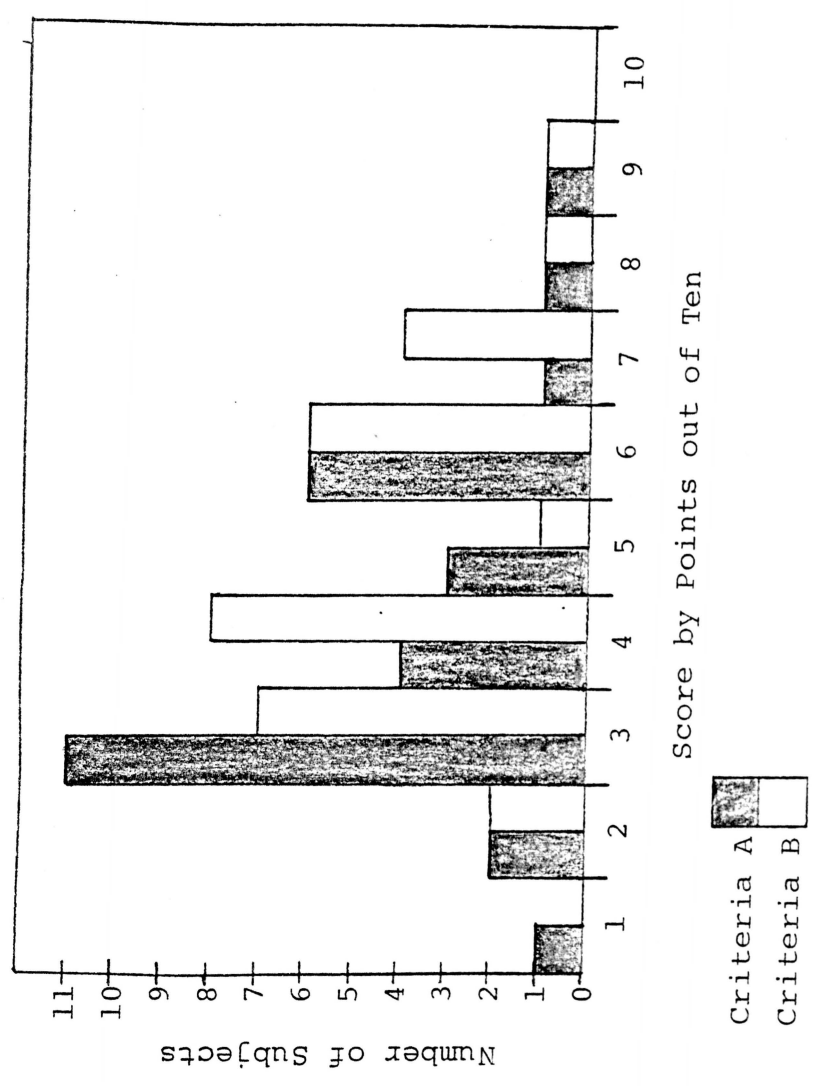
Figure 4. Distribution of scores on Dietary Compliance Tool.

percentage as identified by the items on the Dietary Compliance Tool.

Summary of Findings

Findings of the study are summarized as follows:

1. The sample of thirty non-insulin-dependent diabetic patients was as follows: (a) 80 percent female, (b) 50 percent black, (c) 46 percent 60 to 70 years of age, (d) 57 percent married, and (e) 53 percent living with one other person

2. Seventy percent of the sample chose more than 75 percent positive responses on the Health Belief Tool

3. More than 90 percent of the sample responded positively to Health Belief Tool items regarding knowledge of treatment, doctor-patient interaction, perception of severity, perception of susceptibility, and perception of efficacy of treatment

4. Less then 25 percent of the sample responded positively to Health Belief Tool items regarding knowledge of diabetes and attendance at diabetic club meetings

5. Eighty percent of the sample by Criteria A and 73 percent by Criteria B made low to moderate scores (3 to 6 points) on the Dietary Compliance Tool

Figure 5. Frequency of data on Dietary Compliance Tool items.

6. Sixty percent of the sample by Criteria A showed above-normal fasting blood glucose values on the Dietary Compliance Tool

7. Seventy percent of the sample showed above-normal weight measures on the Dietary Compliance Tool

8. Sixty percent of the non-insulin-dependent sample was identified as being on insulin therapy

9. Eighty-seven percent of the sample had not had diabetes-related hospitalizations in the past six months

10. Positive health beliefs had a low correlation with dietary compliance in the sample in this study

CHAPTER V

SUMMARY OF THE STUDY

This study was conducted to determine the relationship between general health beliefs and dietary compliance in adult diabetics. The basic research design was explanatory survey research, ex post facto in nature. This chapter includes a summary of the study, discussion of the findings of the study, conclusions and implications based on these findings, and recommendations for further study.

Summary

The statement of the problem for this study was the following: Does a diabetic patient's general health beliefs relate significantly to his compliance with dietary therapy? The theoretical framework for the study was the Health Belief Model (Becker 1974). The following null hypothesis was formulated for investigation: There is no significant relationship between a diabetic patient's general health beliefs and his compliance with dietary therapy.

The study was conducted in a family practice clinic in a town with a population of 100,000 in the southwestern region of the United States. The sample of convenience, thirty non-insulin-dependent diabetic patients, was acquired as the individuals became available to the investigator. Data were collected by means of a structured interview using the Health Belief Tool and a medical record review using the Dietary Compliance Tool. Both instruments were developed by the researcher. The scores on the Health Belief Tool were correlated with the scores on the Dietary Compliance Tool using Pearson's product moment correlation coefficient. Descriptive statistics were used to report demographic characteristics and general tendencies on certain items of the instruments. Findings of the study are summarized as follows:

1. The sample of thirty non-insulin-dependent diabetic patients was as follows: (a) 80 percent female, (b) 50 percent black, (c) 46 percent 60 to 70 years of age, (d) 57 percent married, and (e) 53 percent living with one other person

2. Seventy percent of the sample chose more than 75 percent positive responses on the Health Belief Tool

3. More than 90 percent of the sample responded positively to Health Belief Tool items regarding knowledge of treatment, doctor-patient interaction, perception of severity, perception of susceptibility, and perception of efficacy of treatment

4. Less than 25 percent of the sample responded positively to Health Belief Tool items regarding knowledge of diabetes and attendance at diabetic club meetings

5. Eighty percent of the sample by Criteria A and 73 percent by Criteria B made low to moderate scores (3 to 6 points) on the Dietary Compliance Tool

6. Sixty percent of the sample by Criteria A showed above-normal fasting blood glucose values on the Dietary Compliance Tool

7. Seventy percent of the sample showed above-normal weight measures on the Dietary Compliance Tool

8. Sixty percent of the non-insulin-dependent sample was identified as being on insulin therapy

9. Eighty-seven percent of the sample had not had diabetes-related hospitalizations in the past six months

10. Positive health beliefs had a low correlation with dietary compliance in the sample in this study

Discussion of Findings

Practical meaning and value may be derived from this study by the following interpretation of the results:

1. Demographic characteristics of the sample indicate that the majority of subjects in this study were female, black, married individuals between the ages of 60 and 70 years. Could it be that diabetes is more prevalent in older black females who are married? Or could it be that these patients utilize the services of the clinic in this study more than other groups of patients such as males, young adults, or non-blacks? Early reports regarding the incidence of diabetes have indicated a prevalence of diabetes in older black women (Pincus and White 1933). West (1971b) has attributed the high rate of diabetes in black women to their tendency toward obesity secondary to poor diet habits and multiple pregnancies. Older individuals are more susceptible to diabetes since the aging process may contribute to the reduction of glucose utilization and/or insulin responsiveness in the body's cells (Thomas 1976)

2. Most of the sample were noncompliant although they held positive reliefs regarding their knowledge of treatment, doctor-patient interaction, and perceptions of

severity, susceptibility, and efficacy of treatment. In

contrast to several studies (Haefner and Kirscht 1970;

Becker and Maiman 1975; Becker et al. 1975), this find-

ing may indicate that some diabetic patients express

verbally certain positive beliefs that may not be

decisive factors in determining their health behavior

3. Most of the subjects were noncompliant and

demonstrated a lack of knowledge of their disease and

very little involvement with diabetic meetings. Although

several studies have found no association between a

patient's knowledge of his disease and compliance, lack

of knowledge may be a contributing factor to noncompli-

ance in this study (Donabedian and Rosenfeld 1964; Vin-

cent 1971; Bille 1977). The lack of involvement with

diabetic meetings may relate directly to the fact that

the local chapter of the American Diabetes Association

is presently inactive. As Stunkard, Levine, and Fox

(1970) have reported, group activity may promote positive

changes in the health behavior of the group members

4. Generally noncompliant with dietary therapy,

the diabetic patients in this study were usually obese

with above-normal fasting blood glucose values and were

on insulin therapy with very few hospitalizations for

diabetic treatment. Similarly, Smith (1977) has described

the typical adult diabetic as ketosis-resistant and
obese who may be placed on insulin therapy when blood
glucose values are high due to continued over-consump-
tion or a lack of weight loss

     5. The failure to demonstrate a significant
relationship between the diabetic subjects' health be-
liefs and their dietary compliance suggests that the
two variables may not be related significantly contrary
to the theories of several investigators (Kasl 1974;
Kirscht 1974; Rosenstock 1974; Becker and Maiman 1975;
Haynes 1976). Another explanation may be that the study
did not adequately measure one or the other or both of
the variables. The size of the sample may have been
a factor. Feinstein (1976) has discussed the difficul-
ties of subjective measurement in human research while
Haynes (1976) has recommended increased efforts toward
the development of effective tools to study the beliefs
and behavior of patients. Although not routine in many
clinics, the two-hour postprandial blood glucose test or
the glucose tolerance test are more sensitive measure-
ments of diabetic control (Marble 1978; Flood 1979).
Use of these tests as indicators of dietary compliance
would be ideal.

Conclusions and Implications

The following conclusions and implications are based on the findings of the study:

1. The sample was representative of the subjects reported in the relevant literature as discussed in the findings section. The implication for nurses is clear regarding teaching of the younger black female in the areas of nutrition and family planning

2. Pencil and paper tests insofar as patients' beliefs may be misleading. Nursing care may need to be based on observed behavior rather than verbalization of the patient on beliefs regarding diabetes

3. Lack of knowledge may be a contributing factor in this sample. Encouraging the teaching function of nursing care may be of assistance. Peer support and sharing of information would be a benefit derived from attendance at the local chapter of the American Diabetes Association were it reactivated

4. The influence of Health Belief Model variables on dietary compliance is uncertain. Some of these variables have been associated with compliance but not with any great degree of consistency; therefore, continued research seems necessary

5. The adequate measurement of patient beliefs utilizing the Health Belief Tool is difficult due to the subjective nature of the items and the personalities of the subjects and the investigator. The adequate measurement of diabetic control utilizing the Dietary Compliance Tool is uncertain due to the use of the least sensitive method (fasting blood glucose) for measuring glucose utilization in the diabetic patient. The implication here is that the two researcher-developed tools need further study   .

Recommendations for Further Study

Suggestions for further study include the following recommendations:

1. The Health Belief Tool should be revised to include the following: (a) an area to assess the influence of familial incidence and complications of diabetes, (b) more items to measure knowledge of disease, (c) fewer qualitative items

2. The two-hour postprandial blood glucose level should be utilized as one of the methods for measuring diabetic control on the Dietary Compliance Tool

3. The Health Belief Tool should be evaluated using interrater reliability techniques

4. A similar study should be conducted with more subjects in the sample

5. Similar research should be conducted in a different socioeconomic setting such as a private clinic

APPENDIX A

TEXAS WOMAN'S UNIVERSITY
Box 23717, TWU Station
Denton, Texas 76204

1810 Inwood Road
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: __Sandra Stewart__ Center: _Dallas_

Address: __5906 Caldwell__ Date: _3/31/80_

　　　__Waco, Texas　76710__

Dear_ Ms. Stewart: _____

　　Your study entitled _Health Beliefs and Dietary Compliance in_

Adult Diabetics

has been reviewed by a committee of the Human Subjects Review Committee
and it appears to meet our requirements in regard to protection of the
individual's rights.

　　Please be reminded that both the University and the Department of
Health, Education, and Welfare regulations typically require that
signatures indicating informed consent be obtained from all human
subjects in your studies. These are to be filed with the Human Sub-
jects Review Committee. Any exception to this requirement is noted
below. Furthermore, according to DHEW regulations, another review by
the Committee is required if your project changes.

　　Any special provisions pertaining to your study are noted below:

_X_　Add to informed consent form: No medical service or com-
　　pensation is provided to subjects by the University as a
　　result of injury from participation in research.

____　Add to informed consent form: I UNDERSTAND THAT THE RETURN
OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT
AS A SUBJECT IN THIS RESEARCH.

_____ The filing of signatures of subjects with the Human Subjects Review Committee is not required.

_____ Other:

_____ No special provisions apply.

Sincerely,

Estelle D. Kurtz

Chairman, Human Subjects
Review Committee

at_____ Dallas_____

PK/smu/3/7/80

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____

GRANTS TO Sandra K. Stewart _____
a student enrolled in a program of nursing leading to a
Master's Degree at Texas Woman's University, the privilege
of its facilities in order to study the following problem.

HEALTH BELIEFS AND

DIETARY COMPLIANCE IN

ADULT DIABETICS

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final
    report.

2. The names of consultative or administrative personnel
    in the agency (may) (may not) be identified in the
    final report.

3. The agency (wants) (does not want) a conference with
    the student when the report is completed.

4. The agency is (willing) (unwilling) to allow the
    completed report to be circulated through interlibrary
    loan.

5. Other _____

    _____

Date: June 13, 1980

Signature of Agency Personnel

Sandra K. Stewart   *Helen A. Bush Ph. D., R. n.*
Signature of Student   Signature of Faculty Advisor

*Fill out & sign three copies to be distributed as follows:
Original - Student; First copy - Agency; Second copy - TWU
College of Nursing.

APPENDIX C

WRITTEN EXPLANATION OF THE STUDY

My name is Sandra Stewart. I am a registered nurse currently working toward a Master's degree in nursing at Texas Woman's University. I'm studying adult diabetics, their diets, and their health beliefs. As a part of my study, I will be asking you questions about your diabetes, your diet and medicine, and your general health. I will also be looking at your medical chart to see how your diabetes has affected you over the past six months. My study is designed to assist nurses in learning more about the diabetic patient's diet in relation to their beliefs about health in general.

Participating in this study should not cause you physical discomfort. We can take a short break if you get tired during the questions. It will take about a half-hour of your time while you are waiting to see the doctor. Instead of using your name I will assign a number on your interview information. The same number will be assigned to the information I get from your chart. This will protect your rights of privacy. Your participation or nonparticipation will not influence the quality of care you receive here. The clinic does not require you to participate.

I encourage you to be a part of my study. Benefits that you and/or others may experience by your participation in the study include the personal satisfaction of contributing to nursing research, more information regarding certain aspects of the adult diabetic's diet, and increased awareness of personal health habits and beliefs.

You do not have to write down any answers. There are no right or wrong answers. Your answers should reflect the way _you_ act and believe.

Do you have any questions?

APPENDIX D

INFORMED CONSENT TO ACT AS A SUBJECT
FOR RESEARCH AND INVESTIGATION

1. I hereby authorize Mrs. Sandra Stewart to perform the following investigation:

   a. To interview me about my diabetes, diet, and health beliefs

   b. To review my medical records at the Family Practice Clinic

2. The procedure of investigation listed in Paragraph 1 has been explained to me by Mrs. Sandra Stewart.

3. I understand that the investigations described in Paragraph 1 involve the following possible risks or discomforts:

   a. Loss of time

   b. Fatigue or anxiety

   c. Improper release of data

   d. Personal embarrassment

4. I understand that the investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

   a. Personal satisfaction of contributing to nursing research

    b.   Increased information regarding certain aspects of the adult diabetic's diet

    c.   Increased awareness of personal health habits and beliefs

5.   I understand that no medical service or compensation will be provided to me or any other subjects by the University as a result of injury from participation in this research.

6.   An offer to answer all of my questions regarding the study has been made to me. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

_____

Subject's Signature   Date

APPENDIX E

McMASTER UNIVERSITY
Department of Clinical Epidemiology & Biostatistics

1200 Main Street West, Hamilton, Ontario, L8S 4J9
Telephone: Area Code 416 525-9140

June 8th, 1978.

Mrs. Sandra K. Stewart,
5906 Caldwell,
Waco, Texas 76710.

Dear Mrs. Stewart:

As requested, I am enclosing a copy of the Standardized Compliance Questionnaire for use as you deem appropriate. I should just mention, the questionnaire was developed in 1976 and has not been modified since that time.

I hope this instrument is of some assistance.

Sincerely yours,

Jane Sicurella (Mrs.)

js
Encl.

APPENDIX F

HEALTH BELIEFS TOOL

Knowledge of Diabetes

1. Diabetes is a disease caused mostly by
   _____eating the wrong foods
   _____not enough insulin in the body (+)
   _____don't know

Knowledge of Treatment

2. What is the most important thing you do for your diabetes:
   _____eat right (+)
   _____take your medicine
   _____see the doctor
   _____don't know

3. Has your doctor put you on a diet?
   _____yes (+)
   _____no
   _____don't know

4. What kind of diet?
   _____no sugar (+)
   _____exchange diet (+)
   _____less calories (+)
   _____eat less of all foods (+)
   _____don't know

5. Has your doctor asked you to lose weight?
   _____yes (+)
   _____no
   _____don't know

6. How much:
   _____lbs. (+)
   _____don't know

Doctor-Patient Interaction

The doctor:

		Agree	Disagree	Don't Know
7.	. . . expects you to do the impossible	_____	(+)	_____
8.	. . . understands how hard it is to stay on your diet	(+)	_____	_____
9.	. . . cares about your health	(+)	_____	_____
10.	. . . doesn't have time to really help you	_____	(+)	_____
11.	. . . isn't very friendly	_____	(+)	_____
12.	. . . listens to your problems	(+)	_____	_____

13. Do you believe that what the doctor tells you to do
is the best thing for you to do?
_____yes (+)
_____sometimes (+)
_____no
_____don't know

General Health Motivation

		Agree	Dis-agree	Don't Know
14.	Most of what happens to your health is a matter of chance.	_____	(+)	_____
15.	Some people are sick a lot because God is punishing them.	_____	(+)	_____
16.	There are things you can do to keep from getting sick.	(+)	_____	_____

17. Which of the following do you do to keep from getting
sick?
_____sleep seven or eight hours each night (+)
_____eat at least two balanced meals each day (+)
_____exercise actively each day (+)
_____take vitamins (+)

_____do some kind of work each day (+)
_____have a physical exam regularly (+)
_____nothing

18. You are healthier if you are
_____a little overweight
_____a little underweight (+)
_____don't know

19. How much do you worry about your health:
_____a lot
_____some (+)
_____a little (+)
_____none
_____don't know

Perception of Severity

	Agree	Dis-agree	Don't Know
20. Your diabetes is not serious enought to change your eating habits	_____	(+)	_____
21. You have changed your daily living habits (eating, sleeping, exercise, ets)	(+)	_____	_____
22. You would rather have cancer than diabetes	_____	(+)	_____
23. You would rather have emphysema than diabetes	_____	(+)	_____
24. You would rather have heart trouble than diabetes	_____	(+)	_____

Perception of Susceptibility

25. If your diabetes is not controlled, you will develop bad eyes, bad heart, or bad circulation	(+)	_____	_____

		Agree	Disagree	Don't Know
26.	If you eat the wrong things, you can take more insulin to take care of it	_____	(+)	_____

Perception of Efficacy of Treatment

		Agree	Disagree	Don't Know
27.	Your diabetes will be better controlled if you stay on your diet	(+)	_____	_____
28.	It doesn't really matter what you eat if you take your medicine or insulin	_____	(+)	_____

29. When you stay on your diet, do you feel
   _____better (+)
   _____worse
   _____no different
   _____don't know

30. When you go off your diet, do you feel
   _____better
   _____worse (+)
   _____no different
   _____don't know

Perception of Barriers to Treatment

31. Is it hard to stay on your diet?
   _____yes (+)
   _____no
   _____don't know

32. When is it hard:
   _____All of the time
   _____Most of the time (+)
   _____Some of the time (+)
   _____None of the time

33. What makes it hard to stay on your diet?
   _____It takes too much time
   _____It's too hard to understand

_____It's too much work
_____It costs too much
_____It doesn't satisfy your appetite
_____Your family and friends don't understand
_____You like sweets too much to give them up
_____It makes you feel different from other people
_____You don't like anyone telling you what to eat
_____It's too hard to change old habits
_____You don't really want to change
_____Don't know
_____Other _____

Cues to Action

34. What is the main reason you try to stay on your diet?
    _____The doctor will get mad if you don't
    _____You feel better when you stay on it (+)
    _____You feel guilty if you go off it
    _____You will probably live longer (+)
    _____Your family makes you stay on it
    _____You don't want to have complications (+)
    _____You want to stay out of the hospital (+)
    _____You believe in the doctor's advice (+)
    _____Don't know
    _____Other

		Yes	No	Don't Know
35.	Do you talk to other diabetics about their diets?	(+)	___	___
36.	Does your family help you with your diet?	(+)		___
37.	Do you go to the diabetic club meetings?	(+)	___	___

Perception of Compliance

38. How many times have you gone off your diet in the
     past week?
     _____ 0-3 (+)
     _____ 4-10
     _____ 11-21

Demographic Data

1. Sex   M _____
            F _____

2. Race   W _____
            B _____
           SP _____
        Other _____

3. Year of birth _____

4. Marital Status
       M _____   Never married _____
     Sep _____   W _____
       D _____   Other _____

5. How many people live your house? _____

6. How long have you been a diabetic? _____

7. How many times have you been hospitalized for your
    diabetes? _____

APPENDIX G

PANEL OF EXPERTS

Kay Avant, R.N., Ph.D.
Assistant Professor of Nursing

Lewis M. Barker, Ph.D.
Associate Professor of Psychology

Linda Watts Bostwick, C.R.N., M.N.
Staff Family Nurse Practitioner

Cyndi Patton-Morris, R.D., M.S.
Staff Nutritionist

APPENDIX H

DIETARY COMPLIANCE TOOL

		Today	3 mos. ago	6 mos. ago
1.	Blood Glucose:	_____	_____	_____
2.	Weight:	_____	_____	_____
	Height:	_____	_____	_____
3.	Medication	_____	_____	_____
	Type:	_____	_____	_____
	Dose:	_____	_____	_____

4. General Health: Hospitalizations or Major
                       Infections (Diabetes-related)
                       in the past 6 mos.

_____Yes   _____No

Scoring

1. 1 point given for each value of 80-120 mg/100 ml.

2. 1 point given if dose increase = 1 time

   2 points given if dose increase = 0 times

   3 points given if no medication prescribed

4. 1 point given if no hospitalization or major infec-
   tions in 6 mos.

Total Possible Points = 10

Note: Upon recommendation of two experts from the panel,
      Item 1 was scored using a different value for blood
      glucose level. Therefore, Criteria A = 80-120
      mg/100ml and Criteria B $\leq$ 140 mg/100ml.

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