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AN EXPERIMENTAL STUDY OF ATTRIBUTIONS AND DIABETIC SELF-CONTROL

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AN EXPERIMENTAL STUDY OF ATTRIBUTIONS AND DIABETIC SELF-CONTROL

By

Michael William Radke

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ABSTRACT

AN EXPERIMENTAL STUDY OF ATTRIBUTIONS AND DIABETIC SELF-CONTROL

By

Michael William Radke

The primary focus of this research was to test principles established in behavioral science research on the Attribution Process in relation to the medical problem of Diabetic Self-Control. The major variables considered were Diabetic Control, Psychological Attributions (Effort, Ability, Task Difficulty, and Luck), and Physical Attribution Errors. Two covariables were also addressed, Health Beliefs, and Regimen Difficulty, because previous research suggested that these covariables were related to Diabetic Control.

The study was completed in two major parts. A pilot study was conducted to establish the instrumentation of the variables and to examine the Attribution intervention. The full study was then undertaken to test the effects of the Attribution Treatment in relation to a feedback treatment and a control group.

Twenty-seven Diabetic Patients were selected to participate in the full study. Initial data was collected on patient's Regimen Difficulty and Health Beliefs. Data on Diabetic Control, Psychological Attributions and Physical Attribution Errors was collected during pretest, and post test weeks using patient self-reports via phone conversations. The treatments were conducted over a two-week period followed by a week when there was no contact with the patients.

A completely crossed and balanced design was used. Patients were randomly assigned to one of the three treatment groups. The Control Group recorded and reported Diabetic Control results, but did not speak directly with a physician during the two treatment weeks. The Feedback Group, recorded and reported Diabetic Control Data, and were given specific feedback from a physician identifying their performance as successful or not successful. The Attribution Group reported Diabetic Control data, received feedback on their success, were trained to attribute results to "effort," and to identify the correct physical causes of their Diabetic Control results.

The analysis was completed in two steps. A series of six regression analysis were done on Diabetic Control, Physical Attribution Errors and each of the four Psychological Attribution Errors using Regimen Difficulty, Health Beliefs and related pretest scores to predict post test

scores. Evidence of a linear relationship was found for Diabetic Control, and Effort and Luck Attributions. Standardized Residuals were computed and a Multivariate Analysis of Variance was done using these Residuals. The results of this analysis indicated that there were no differences due to treatments. Some important implications were noted regarding the measures used. Future research was suggested for the Health Care practitioners and for the individual interested in the Attribution Process.

DEDICATION

To Kathy for all your hard work and daily sacrifices which made this possible. Together we turn another corner in our lives knowing that the completion of this project has set another cornerstone upon which we will build our future.

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

HB refers to Patient's Health Beliefs as measured by the Health Belief Questionnaires of the pilot or full study.

RD refers to Patient's Regimen Difficulty. RD indicates the relative degree of difficulty which is associated with each patient's individual Diabetic Regimen.

DC refers to Patient's Diebetic Control. This dependent measure identifies how well the patient controlled their Diabetic Condition as measured by periodic self-reports.

PA refers to the Psychological Attributions which the patient invoked to explain their Diabetic Control Results. There are four subcategories for PA, sometimes referred to as PA-Effort, PA Ability, PA-Task Difficulty and PA-Luck.

PAE refers to the Physical Attribution Errors which the patient invoked to explain their diabetic control results. PAE is defined as the amount of disagreement between the physician's and the patient's assessments of the physical causes of diabetic control.

CHAPTER I

INTRODUCTION

Attribution Theory was initially described by Heider (1958) as he explored the common man's thinking about achievement. In this description of "naive" psychology, Heider recognized the basic principles of what was to become Attribution Theory. First, the common man as an untrained or naive psychologist is motivated to develop and maintain control over himself and his environment. And secondly, he is constantly searching for explanatory causes to achievement events in hopes that through understanding these causes he will be able to control them.

The two basic principles stated above identify the foundation upon which Attribution Theory has been built. Since Heider's initial description of naive psychology, considerable research has been done to validate, verify, and more fully describe the principles and implications of Attribution Theory. Current Attribution proponents are concerned with the processes by which an individual interprets achievement outcomes as being caused by a particular part of a relatively stable environment (Kelly, 1967; Weiner,

Heckhausen, Meyer & Cook, 1972; Harvey, Ickes & Kidd, 1976). Attribution Theory still assumes that people are motivated to strive for mastery and control over themselves and their environments (Kelly, 1971; Wortman, 1976).

Weiner et al. (1972) have described a model consistent with other Attribution theorists depicting causal attributions as mediating factors between achievement stimuli and behavior. "The model indicates that a stimulus arouses cognitions about the causes of a behavioral outcome. The cognitions determine affective responses and goal expectancies as well as subsequent behaviors" (Weiner, 1972, p. 351). The current theory of causal attributions therefore postulates that an individual's need to be "in control" results in his use of causal attributions. These attributions influence the person's motivation and form the mediating link between stimuli and behavior.

Attribution Theory and research has not strayed from the basic principle described originally by Heider, and generally authors in this area have focused on tasks of importance to the common man. However, few articles or reports can be found addressing the attributional processes involved in medical problems, despite the fact that many health maintenance tasks assigned to patients clearly parallel those tasks currently being successfully studied by attribution researchers.

By describing the lack of attention paid to medical problems by proponents of the Attribution position, this

chapter will identify the need for the research being undertaken here. One specific problem, Diabetic Patient Compliance, will be introduced and discussed as a potential beneficiary of the extension of applied attribution research. This chapter will also outline the possible contributions which can be made toward Attribution Theory by extending its research base into the medical/behavioral context. Finally, this chapter will identify the hypotheses of the study and provide an overview of the methodology to be used.

The Problems

Limitations of Attribution Research

Research based on Attribution Theory has examined the relationship between achievement outcome stimuli and attributions (Frieze & Weiner, 1971; Langer & Roth, 1975), between attributions and motivation (McMahan, 1973; Fontaine, 1974; Sohn, 1977; Weiner & Kukla, 1970; Dweck, 1975), and between attributions and behavior (Rest, 1976; Jones et al., 1968; Dweck, 1975). These studies have provided tentative support for the attribution model presented by Weiner. Researchers concerned with attribution processes have examined basic attribution principles in relation to various types of achievement tasks. Academic tasks have been the focus of many research efforts. Frieze (1976) and others (Langer, 1975; Langer & Roth, 1975; Weiner & Kukla, 1970;

Meyer et al., 1976) have explored various aspects of the attribution process using games of chance as the achievement task. Numerous other authors have extended their attribution research to social-emotional tasks (Storms & McCaul, 1976; and Snyder, 1976), and physical and professional skill tasks (Meyer et al., 1976). However, few attribution research projects have addressed tasks involving health maintenance.

Attribution and Medical/ Behavioral Problems

In order to extend the principles of Attribution to the medical field, the problem of medical patient compliance was selected. The medical literature consistently laments the problem of patient noncompliance with well established and successful regimens (Gillum & Barsky, 1974; Francis et al., 1969; Davis, 1966). Research in this field suggests that patients with chronic conditions are less likely to comply with their regimen when (1) required to make changes in patterns of behavior or habits, (2) regimens involve more than one factor or are time consuming, (3) compliance requires patient judgement or is painful.

All of these factors can play a part for the diabetic patient who frequently must follow a strict diet and must change patterns of behavior to do so. Diabetic patients may be required to take medication orally or by injection, and exercise regularly, adding to the complexity of their regimen. They also need to understand their disease and the

causes of frequently occurring problems, and make decisions regarding the routine aspects of the disease independent of the physician (Bloom, 1977).

The consequencies of noncompliance for the diabetic makes this population worthy of study. Diabetics who do not follow their regimen may suffer complications ranging in severity from the annoyance of frequent urination to loss of vision, renal disease and early death (Costrini & Thompson, 1978). The society as a whole may also suffer consequences of diabetic noncompliance. Such noncompliance may result in frequent contacts with physicians, increased costs for medical care (insurance rates increase), and loss of productivity as patients become unable to perform in the home or workplace and are added to welfare programs. Estimates of diabetic patient noncompliance range from 19% to 72% (Stimson, 1974).

The wide range of noncompliance reported by Stimson (1974) indicates that a variety of factors may be contributing to this problem. Mathews and Hingson (1977) discuss the research related to noncompliance. They conclude that the seriousness or painfulness of an illness does not necessarily ensure high compliance, nor do demographic data indicate which patients will be compliant or noncompliant. "Studies which report <u>no</u> relation between patient compliance and social class, age, sex, education, occupation, income, and marital status outnumber those which do, almost three to one" (Mathews & Hingson, 1977, p. 880). Further

Mathews and Hingson state that although it is still believed that knowledge of an illness and understanding of how to follow a regimen are necessary for successful compliance, they are not sufficient.

The factors which do seem related to compliance are: the nature of the regimen, and the patient's belief about the illness and the treatment. An article in the Journal of Family Practice (1977, p. 889) states: "Treatment plans most likely to evoke noncompliant behaviors are those which are complex, require substantial changes in the patient's daily habits, and in which the benefits are imperceptible to the patient or are slow to appear." Many studies support the hypotheses that the complexity or difficulty of the patient's regimen influence compliance (Curtis, 1960; Francis & Korsh, 1969; Gatley, 1968; Latiolas & Berry, 1969). All of the factors mentioned in this article are, to some degree, characteristic of the diabetic regimen.

In his "Health Belief" model, Becker (1976) has identified the importance of the patient's beliefs related to compliance. This model suggests that the following factors effect compliance:

(1) the patients' belief that because of their illness they are susceptible to complications,

(2) the patients' belief that the consequences of their illness are severe,

(3) the patients' belief that their treatment will be highly effective, and

(4) the patients' belief that there are no major obstacles to compliance with the regimen.

Although this model is still in its formative stages, there has been some evidence to support the relationship between these beliefs and compliance.

Given the importance of diabetic patient noncompliance and the previous research on compliance, the question which arises is: What factors of the diabetic problem lead to the belief that attribution principles will contribute to a solution? In answer to this question it is important to examine the characteristics of tasks previously studied in attribution research, and then draw parallels to the characteristics of diabetic compliance tasks.

Attribution research has typically studied tasks having the following characteristics. First, the task is one which involves achievement, i.e., a task in which degrees of success can be determined in relation to some standard of excellence (McClelland, Atkinson, Clark & Lowell, 1953). This is also true of the task of diabetic compliance. Degrees of success at the task of diabetic control can be determined in the patient's home, the doctor's office or laboratory. Secondly, attribution research tasks always involve causal relationships. Typically they have addressed the psychological causes of success or failure at a task, i.e., effort, ability, task difficulty and luck (Weiner et al., 1972). These same psychological causes may be important to the motivation of diabetics toward compliance.

There are numerous nonpsychological causal relationships which, if understood, may help patients comply, i.e., the biological causes of success or failure at diabetic control. Thirdly, attribution research tasks involve dimensions of self control. In fact, as stated earlier, one of the assumptions of attribution theory is that people strive to develop and maintain control over themselves and their environments. Again this is characteristic of the diabetic who, upon release from the hospital, is given the responsibility and control over the routine aspects of his/her disease. Finally, previously studied attribution tasks involve cognition, motivation and behavior change. These are also dimensions of the diabetic task in that the patient must understand to some degree his/her condition (cognition), the patient must be motivated to comply, and the patient must adjust behavior patterns if s/he is to be successful at the task.

Based upon the commonalities of previously studied attribution tasks and the task of compliance with a diabetic regimen, it seems that the principles of attribution may contribute to a solution to diabetic compliance.

Misattributions or Attributional Errors

The body of knowledge surrounding Attribution Theory may reciprocally benefit from studies in applied fields. Research on diabetic patients' attributions provide a forum to address some outstanding problems plaguing

Attribution Theory. One such problem found in attribution research involves Attribution Errors. Heider (1958) in the early development of Attribution Theory recognized misattributions as a serious problem. More recently Storms and McCaul (1976) suggest that there are important implications to come from studies of attributional errors. Misattributions have been studied by Henslin (1967) who used crap (dice) shooting tasks. He found that even though outcomes on this task are completely controlled by chance, subjects continued to believe their ability or effort contributed substantially to success or failure.

Currently there is no clear answer to the problems posed by attributional errors. The crux of this problem stems from ambiguous definitions of errors. For example, when a student fails at a novel academic achievement task, there is no sure means of establishing that the outcome was caused by the lack of effort (or ability), by a task which was too difficult, or simply by poor luck. Thus it is difficult to say the student is making an error in his attributions, regardless of which psychological attribution s/he invokes.

However, the medical field has a much more substantial definition of many causal relationships. For example, a hypoglycemic reaction in a diabetic is usually caused by either too much insulin or exercise, or too little food. Usually the physician can narrow these causes down to the most correct one through a discussion with the patient.

Thus, studies of attributional errors in the medical field may shed some light on the process of misattributions by describing the process of attribution errors in relation to physical causes of success or failure at the achievement task of diabetic control.

Hypotheses and General Methodology

The present study attempted to extend findings of previous attribution research to the applied task of diabetic self control, and to examine the process of attribution errors as these errors related to the physical causes of achievement in diabetic self control. Several hypotheses were considered within the framework of an experimental design.

Among the many studies conducted in the field of Attribution Theory, numerous reports (Rest, 1976; Jones et al., 1968; Beckman, 1970) concluded that "causal attributions do have substantial implications for the person's future behavior" (Duval, Hensley & Neely, 1976, p. 196). Dweck (1975) reported a study of 8-13 year old children who had adopted a learned helplessness pattern of behavior which clearly supported this hypothesis. The subjects were trained to take responsibility for achievement outcomes, and to attribute the causes of these outcomes to "effort" rather than to ability, task difficulty, or luck. Chapin and Dyck (1976) replicated Dweck's study using an improved design. Both studies concluded that an experimental intervention

which effectively increase a subject's "effort" attributions affect their subsequent behaviors on an achievement task.

The study undertaken here attempted to extend these findings in relation to diabetic self-control. Specifically the hypothesis tested relating to attribution and subsequent behavior were: *Diabetic patients who are given Attribution Training will: (1) exhibit more internal "effort" Psychological Attributions than other patients, and (2) exhibit better Diabetic Control than other patients.*

Methodologically the present study was designed to examine diabetic control of patients in three treatment groups. The first group simply reported diabetic control results and followed the standard patterns of care and interactions normally given to diabetic patients by their physician. The second group reported diabetic control results and were given feedback from their physician on the degree of success or failure attained. The third group reported their results, were given feedback, and were instructed by the physician to attribute diabetic control outcomes to "effort." The design of these three treatments provided statistical controls, and allowed comparisons to be made between an Attribution Treatment, a Feedback Treatment, and a Control Group. The Feedback Treatment was included because, as Chapin and Dyck (1976) suggest, Behaviorist principles imply that Feedback without Attribution training is all that is necessary to change patterns of behavior.

To briefly review the assertions of Behavioristic Psychology advocates, these individuals have demonstrated the effectiveness of reinforcement, shaping, punishment, etc. in changing behaviors (Catania, 1968). Typically the implementation of these behavior change principles involved tangible consequences. However, more recently the necessity for tangible consequences has been modified to include or be replaced by other kinds of feedback (Henderson, 1974). For example verbal feedback which is given by a credible source and which clearly communicates specific behaviors and consequences may be effective in changing behaviors.

It is the assumption of this research that verbal feedback, specifying behaviors and consequences, would be most effective with the adult population being utilized. Further, the physician seemed to be the most credible source for the feedback. The inclusion of a Feedback Treatment designed according to the above considerations is felt to provide an important control in this study. In comparison to the Attribution Treatment, the Feedback Treatment was less complex and required less physician/patient time. This study provided a means of comparing results of treatments involving feedback and attribution training.

The Control Group treatment was designed to most closely resemble the standard activities conducted with Diabetic Patients. Thus the inclusion of the three treatment groups allowed comparisons to be made between patients receiving standard care, feedback or attribution training.

The other hypothesis of importance in this study involves Attribution Errors. The problem being examined here (Diabetic Control) provided a unique means of studying the attribution error process. It is assumed that people are not only concerned about the psychological attributions (effort, ability, task difficulty, and luck) which are typically studied by the researchers, but that people are also concerned about more veridical causes (Snyder, p. 53-72 in Harvey, Ickes & Kidd, 1976). Medical researchers have determined five basic causal factors which contribute to success or failure at diabetic control. Poor or successful diabetic control can be caused by adjustments in (1) diet, (2) medication, (3) exercise, (4) stress, or (5) general health (Galloway, 1973). These five factors have come to be accepted by medical professionals as the most important causes of success or failure at diabetic control. Thus when a patient fails (or succeeds) at controlling their diabetes, the physician can usually identify the primary (secondary, etc.) factor contributing to the outcome.

Based upon the above analysis, this study attempted to measure Physical Attribution Errors for Diabetic Control Outcomes by eliciting physical attributions from the patient, and comparing these to the physical attributions which the physician invokes. Thus, Physical Attribution Errors were defined as any discrepancy between the patient's physical attribution priorities and the expert's (physician's) Physical Attribution priorities.

Patients in the "Attribution Treatment" therefore were also given consistent instruction regarding which of the five physical factors contributed to their diabetic control outcomes. And the following hypothesis was incorporated into the study: *Diabetic Patients who are given Attribution Training will exhibit fewer errors in Physical Attributions than other patients.*

Summary

The primary focus of this research is to test principles established in basic behavioral science research on the Attribution process in relation to medical problems. Diabetic Patient Self Control or Compliance will be studied.

The research undertaken here will also attempt to examine patient Attributional Errors relating to the physical causes of achievement at Diabetic Control. To summarize the methodology proposed, a completely crossed and balanced design will be used. Patients will be randomly assigned to one of three treatment groups. Group 1 No Physician Contact, will record and report Diabetic Control Results, but will not speak directly with a physician during the treatment weeks. Group 2, Feedback Only, will record and report Diabetic Control Results, and be given feedback from the physician identifying their performance as successful or not successful. Group 3, Attribution Training and Feedback, will report Diabetic Control Results, receive feedback from the physician, be trained to attribute results to "effort,"

and be trained to identify the correct physical causes of success or failure.

Data will be collected by self reports via phone conversations. Two covariables will be included in the study, Patient's Health Beliefs, and Patient's Regimen Difficulty. The major dependent variable is Diabetic Control. Other variables of interest are Patient's Psychological Attributions and Physical Attribution Errors.

The remaining chapters of this report will describe the study in detail. Chapter II, Review of the Literature, discusses the relevant research from the Attribution field, and the medical field regarding Diabetes and Patient Compliance.

Chapter III, Methodology, provides a more detailed look at the design used in both the pilot study and the full study. In this chapter the variables are defined, the sample is described, and the analysis procedures are briefly outlined.

Chapter IV, Results, presents a more detailed discussion of the analysis. The findings are reported for both the pilot study and the full study.

The final chapter, Discussion and Conclusions, reviews the results, drawing appropriate conclusions. Suggestions for future studies will be made, and implications of this study will be discussed in some detail.

CHAPTER II

REVIEW OF THE LITERATURE

Many medical care providers have recently recognized the important role which patients must play in their own health care. This concept has gained much support as researchers document the prevalance of noncompliance with well established and successful regimens, and strive to identify those factors which will help patients comply. Because of the nature of the compliance problem, application of the principles established in attribution theory and research suggest a potential solution.

This chapter will review the literature related to the general topic of compliance, and examine findings directly related to compliance or self-control of diabetic patients. Attribution Theory and related research will then be discussed. Four specific areas of the attribution literature will be reviewed: (1) attributions and self control, (2) attributional categories, (3) misattributions, and (4) strategies for changing attributions and the subsequent effects on behavior.

Patient Compliance, General Considerations

A variety of studies have been conducted on the topic of "Patient Compliance," the term used by medical professionals to describe the degree to which patients cooperate with the regimen prescribed by the physician. Schwartz (1962) studying chronically ill patients found that 59% were making at least one error in complying with their regimen, and that 26% of these errors were potentially dangerous. Stimson (1974) recently reviewed the medical literature on compliance and found reports stating that noncompliance ranges between 19% and 72%. Most studies in this review are considered to error on the conservative side.

Mathews and Hingson (1977) in a study of the factors related to compliance, found that few factors consistently appear related to compliance. Mathews and Hingson conclude that the type of disease, its seriousness, or painfulness does not relate to compliance. There also appears to be no relationship between compliance and numerous demographic variables (i.e., social class, age, sex, education, occupation, income and marital status, p. 880). They observe that most medical practitioners still believe knowledge of an illness and an understanding of how to follow a regimen are necessary but not sufficient to obtain compliance.

Two other factors do seem related to compliance, the complexity of a regimen, and the health beliefs of the patient. Physician reports generally identify regimen

difficulty as the major factor involved in noncompliance. Specifically, a recent article states, "Treatment plans most likely to evoke noncompliant behavior are those which are complex, require substantial changes in the patient's daily habits, and in which the benefits are imperceptible to patients or are slow to appear" (_____ Patient Noncompliance, 1977, p. 889).

Hulka et al. (1976) conducted one study on this topic. They obtained the cooperation of 46 physicians and 357 patients who had histories of diabetes or congestive heart failure. Four "compliance" related variables were used, i.e., omission rate, commission rate, scheduling misconception rate, and scheduling noncompliance. High scores on each of these variables indicated high noncompliance. The conclusions of this study state that the number of drugs and complexity of the regimen schedule are clearly associated with the errors of omission and comission (Hulka et al., 1976, p. 847). Other studies essentially support these conclusions (Davis & Eichhorn, 1963; Gillium & Barsky, 1974; Davis, 1966; Francis & Korsh, 1969).

Another factor emerging in the literature as being related to compliance is the patient's beliefs regarding health. Becker initiated a program of research based upon the "Health Belief" model of compliance (Becker et al., 1977). Four factors consistently emerge from this research as related to compliance: (1) susceptibility, (2) severity, (3) treatment benefits, and (4) treatment barriers.

Heinzelmann (1962) conducted a survey of patients and found that those who believed they were susceptible to reoccurrence reported exhibiting more compliant behaviors. Elling et al. (1960), and Becker et al. (1972) found similar correlations between patients' beliefs about susceptibility and compliance. Becker et al. (1972) also found a correlation between patients' compliance and patients' beliefs that the consequences of their illness are severe, and beliefs that they will benefit from following their regimen. Finally, numerous researchers have found that compliance is correlated with patients' beliefs that there are no major barriers (i.e., financial, social or physical) to compliance (Becker, 1977).

Most research reported on this Health Belief Model has been survey research. Results have been analyzed by correlational methods. Several studies have measured health beliefs according to this model prior to examining the degree of compliance (Becker et al., 1972; Charney et al., 1967). But there still is a need to further research this model utilizing more experimental designs and analyses.

The evidence from studies of health beliefs suggests that cognitive factors do play a role in compliance with medical regimens. These studies also frequently allude to the helplessness of patients who are noncompliant (Abrahams, 1977). It is possible that the problem being discussed is not one of compliance, which implies some degree of patient awareness. The term "compliance" also suggests that patients

purposefully and intentionally refuse to follow the doctor's advice. Recent discussion in the literature has emerged which redefines the problem as one of patient responsibility or lack of self control. Shapiro and Shapiro (1980) state:

> . . . it has been noted that simply adjuring patients to be responsible is insufficient motivation for changes. Patients need concrete help in developing the skills which can facilitate their taking responsibility for personal, physical and mental health.
>
> Thus patient education should focus not only on the content of medical self-responsibility (for example, monitoring diet or taking medications), but also on the process of this self-responsibility (that is, the manner in which the patient develops the skills necessary to implement and maintain self-responsible strategies) (Shapiro & Shapiro, 1980, p. 704).

Thus Shapiro and Shapiro have redefined the compliance issue in terms of responsibility and self-control. They then conducted a survey of obstetricians and found that this physician group clearly recognized the need for self-control training of patients in at least nine areas, despite a response rate of only 24.2% (Shapiro & Shapiro, 1980).

Diabetic Patient Compliance

The studies on Patient Compliance have occasionally utilized diabetics in their defined populations. These studies have generally resulted in conclusions similar to those using patients having other chronic conditions.

Lowery and Ducette (1976), in a study of Locus of Control and Diabetic Compliance, documented the extent of the problem in relation to this group. They found that the 60 diabetics in their study averaged between .094 and .185 instances of weight gain per month. Lowery and Ducette argue

that the high incidence found on these two measures indicate frequent and potentially serious noncompliance. They also conclude that compliance is related to the patient's Locus of Control, an important finding because of the relationship between Locus of Control and attribution principles.[1]

Infante (1978), also conducted a study involving interviews with 145 adult diabetics. She utilized physicians' reports to determine diabetic control or compliance for patients. Although the methodology reported in this study left many questions, there was evidence to conclude: " . . . psychosocial factors such as perceptions of self, cost of care, boredom with the therapeutic regimen, anxiety, financial problems, and relationships with significant others were found to have a significant influence on levels of compliance of diabetics" (Infante, 1978, p. 12).

These two studies documented the problem of Diabetic patient noncompliance. However they also identify one problem prevalent in research on compliance. That is, it has been difficult to measure the degree of compliance or diabetic control. Two strategies for measuring diabetic control are common, patient self reports of behaviors between office visits, and physiologic changes.

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[1]Bernard Weiner and numerous colleagues have established the important role which Locus of Control plays in Attribution Theory. For a period of time an ongoing dialogue existed between proponents of Attribution Theory (Weiner et al., 1972; Weiner & Kukla, 1970; McMahan, 1973) and proponents of Locus of Control Theory (see Phares, 1957).

When noncompliance is defined in terms of behaviors of outpatients (e.g., Did you take your medication? Did you take it as prescribed?, etc.) the researcher generally must rely on self-reports of the patient (Davis & Eichhorn, 1964, p. 243). Patients are required to recall and report such behaviors weekly or monthly when they visit the physician's office, and inaccuracies are obviously compounded. When noncompliance is defined in terms of physiologic changes (e.g., weight gain, medical complications, reoccurrence of disease, etc.), the changes are small and subtle, and the researcher must infer that the patient exhibited compliant (or noncompliant) behaviors from the observed physiologic results.

However, recent advances in monitoring a patient's diabetic control and improved methods for self-reports may resolve this problem. Noviks et al. (1976) measured diabetic control by a combination of laboratory tests and physiologic observations. Blood and urine samples were drawn during office visits and hospital admissions, and analyzed in the laboratory to give reliable measures of diabetic control. Weight gain and hyperglycemic symptoms were also measured and validated during office visits and patient chart reviews.

These office or hospital based measurements are both costly and very inconvenient to patients. Similar measures are available for the patients in their home environment, and can be used with only minor loss of reliability.

James et al. (1974) demonstrated that four diabetic urine testing materials can provide similar results to those found in a laboratory. Court et al. (1972) conducted a study of diabetic children and their parents comparing use of three patient urine testing methods. They found that with some training, patients could obtain and report accurate diabetic control results. Shenfield and Steel (1977) found similar results, but cautioned that the accuracy of the patient reports was dependent on adequate training under supervision.

Such home-based urine testing is necessary for the diabetic patient to control their own condition. It must be understood that urine-testing is one of the best feedback mechanisms available to the diabetic patient. Urine glucose and ketone levels fluctuate relatively quickly for the diabetic and usually the fluctuations reflect the degree of diabetic control (Bloom, 1977).

Although self-reports are notoriously subject to errors, a more sophisticated approach to self-report measures may minimize this problem. Previous studies using self-reported diabetic control measures (Infante, 1978; Hulka et al., 1976; Sczupak & Conrad, 1977) required patients to remember, recall, and report symptoms, urine test results or other measures of diabetic control over a span of weeks between patient-physician contacts. Under these conditions patients were likely to not remember accurately, or to report biased results to maintain self-concept. In many studies

these problems could be minimized by (1) obtaining more frequent reports, (2) reporting results only on measures taken recently, (3) reporting results to health care practitioners who could identify "odd" results and verify them, and (4) discussing the importance of accuracy with patients more frequently. These suggestions may not eliminate the problem inherent in self-reports, but they might tend to minimize them.

Patient compliance has been documented in the literature as a significant problem. Researchers have discovered correlations between compliance and two patient characteristics, Regimen Difficulty and Health Beliefs. Current literature has also redefined the problem of compliance in terms of patient responsibility and self-control behaviors. Numerous studies of diabetic patients have demonstrated that patients having this disease exhibit compliance problems similar to those observed in patients having other chronic health conditions. In light of these findings, the literature on Attribution Theory will be reviewed to establish a logical rationale for the application of attribution principles to the problem of diabetic compliance or self control.

Attribution Theory and Research

The theory of Attribution as recently described by Weiner et al. (1972) follows the model described in Figure 2-A. This model is based on two major assumptions

Stimulus	→	Cognitive Activity	→	Expectancy → Affect	→	Behavior
Success or Failure at an Achievement Task	→	Attribution toward effort, ability, task difficulty, or luck	→	Motivation and Direction	→	Failure Behaviors Modified; Success Behaviors Repeated

Figure 2-A.--Weiner's Attribution Model.

inherent in any Attribution Theory, (1) man is motivated to develop and maintain control over himself and his environment, and (2) knowledge of the causes of success or failure leads to better self-control in achievement contexts.

Verification of these two assumptions is an important consideration here because of their relationship to the previous discussion of diabetic compliance. Central to this discussion is the assertion that diabetic patients must learn to maintain control over the routine aspects of their disease.

Attribution and Self-Control

Wortman (1976) states: "the idea that people strive for mastery and control of their environments is certainly not new, and has played a central role in many theoretical statements" (p. 23). White (1964) describes the importance of personal control in reference to efficacy, "The experience of efficacy, based on the effectiveness of one's own activity in dealing with the environment, is a vital root of self-esteem" (p. 151). Combs and Snygg (1959) underscore

the importance of control over both one's environment and one's self, and build a strong argument that what matters most is one's personal views of the multitude of factors effecting daily living. Bandura (1978) also describes the reciprocal relationship between man and the environment. "Psychological functioning involved a continuous reciprocal interaction between behavioral, cognitive and environmental influences" (Bandura, 1978, p. 344).

Various investigations have been conducted to examine the phenomenon of control. Janis (1951) and Kubler-Ross (1969) suggest that people exaggerate the extent to which uncontrollable outcomes (e.g., disease and disasters) are caused by prior behavior. Learner (1970) explains that most people believe in a "just-world hypothesis" where in people reap the benefits of good behavior and suffer the consequences of bad behavior. This just-world hypothesis explains Kubler-Ross's (1969) findings that terminally ill patients often engage in good moralistic behavior in an attempt to ward off death.

The studies by Janis (1951) and Kubler-Ross (1969) point out the importance of personal control in the daily events of disease and disaster. Langer (1975) has demonstrated that personal control is so ingrained into daily thought processes that an illusion of control consistently appears in tasks where no control is possible.

In a series of six studies, Langer (1975) engaged subjects in games of chance (card, lotteries, etc.) and

found evidence to support the hypothesis that the introduction of skill factors (i.e., competition, choice, familiarity, or involvement) results in increased feelings of control over outcomes. Langer and Roth (1975) further examined this phenomenon in a study where successes occurred in a descending, ascending or random order. Sophisticated subjects felt "in control" in the ascending condition even though the task was clearly one controlled by chance (coin toss prediction).

Thus it appears that people do believe they are in control of themselves and their environment, and that characteristics of a task, or patterns of success contribute to illusions of control. These findings lend support to the assumption that people need "to be in control" found in Attribution Theory. Apparently a feeling of control is derived from hypothesizing causal relationships when success (or failure) is perceived. And when subsequent behavior confirms these causal relationships, personal control is further substantiated (Henslin, 1967; Wortman, 1976).

Attributional Categories

Hieder (1958) and others (Weiner, 1972) have defined the four major Psychological Attribution Categories as Effort, Ability, Task Difficulty, and Luck. Weiner (1972) has elaborated upon these categories in his theory. He hypothesizes that they can be sorted on two dimensions, stability and Locus of Control (see Figure 2-B).

	Locus of Control	
	Internal	External
Stable	Ability	Task Difficulty
Unstable	Effort	Luck

Figure 2-B.--Psychological Attribution Categories.

Generally, these four categories have been accepted as the predominant psychological attributions utilized. However, Frieze (1976) conducted a study using an open ended question format to identify the categories naive subjects would generate. She found general support for the four theoretically derived psychological attribution categories, and identified some other previously ignored causal categories. However, as Bar-Tal state, "most researchers have limited themselves to studying the use of the two dimensions and the four causes only, as originally proposed by Weiner" (Bar-Tal, 1978, p. 260).

Although most research and other scholarly reports involving Attribution concepts limit discussions to use of the four psychological Attribution Categories, there appears to be general recognition that attribution principles also will apply to the learning of task-specific causal relationships. Kun and Weiner (1973) allude to such task-specific attribution categories using the example of extreme over- or under-eating. ". . . if one eats much more than normally,

then it may be inferred that he was hungry and that the food was particularly attractive. In a similar manner, if very little food was consumed, then it is likely to be inferred that the person was not hungry and that the food was unattractive" (p. 201).

The important concept imbedded in this discussion is not the introduction of additional attribution categories (hunger and food attractiveness), but that some tasks have attribution categories which are specific to them. In the case of the task of controling one's diabetes, medical practitioners have come to agree that success or failure is caused by five physical factors (medication, diet, general health, exercise, and/or stress). It is the assertion of this research that a study of the attribution processes in diabetic control must consider both the psychological attribution categories and the physical attribution categories.

Misattributions

The inclusion of the physical attribution categories in the present study provides an opportunity to examine a problem recognized by Attribution Theory proponents, i.e., attribution errors. Attribution researchers have recognized the fact that people make misattributions, attributing success or failure to one cause when in fact the outcome is due to another cause.

Langer (1975) and Langer and Roth (1975) in studies already reviewed engaged sophisticated subjects in games of chance, where outcomes are clearly controlled by luck, e.g., the roll of dice, the draw of a card. Despite college sophomore subject's knowledge that outcomes on these tasks are controlled by chance, they still make skill (ability attributions under certain conditions.

Henslin (1967) in a participant-observer study of crap-shooting (dice) players found similar misattributions. If the dice are fair, outcomes at this task are controlled only by luck. However, Henslin observed experienced player's statements indicating both effort and ability attributions were being evoked, i.e., hard throws result in high numbers, soft throws in low numbers, and control can be maximized by concentration and effort.

The importance of the misattribution process is readily apparent. For example, if subjects attribute failure to lack of ability (a stable cause) when in fact the failure is because of lack of effort, the subjects may "give up." They essentially believe they do not have the ability to succeed, therefore it is futile to put forth more effort. Similar problems can occur when misattributions are invoked for the other psychological attribution categories.

Misattributions for the physical causes of diabetic control are equally important in the study of these patients. For example, take the patient whose urine test results

suggest failure at diabetic control. He may attribute the failure to insufficient medication when the real cause is overeating (diet). In this case he may change the amount of insulin or other diabetic medication which would result in weight gain or other more serious problems. Thus it is important for diabetics to make "correct" physical attributions for both success and failure.

Although the literature documents the fact that attribution errors or misattributions do occur, there is still a need for more research which clarifies the misattribution process and suggests methods for correcting these errors. However, Fischhoff (1976) identifies the problem researchers face in studying misattributions, "The primary difficulties with error analysis are that it is often difficult to define unambiguously what is an error and what is not . . ." (Harvey, Ickes, and Kidd, 1976, pp. 441-442).

In the study of diabetic patients' misattributions of physical causes, the problem of ambiguity in defining errors can be remedied. Medical practitioners have not only defined the five primary causes of success or failure at diabetic control, but they have also determined how these five factors influence diabetic control outcomes through research and observation in the controlled environment of the hospital or laboratory (Bloom, 1977; Palumbo, 1977; Dye et al., 1977). Based on the results of these studies, physicians generally can determine which of the five

physical causes of success or failure at diabetic control are playing a major role. Patient misattributions can be determined by taking independent measures of patients' and physicians' physical attributions and calculating the degree of disagreement.

Changing Attributions: Effects on Behavior

Underlying all of the previous discussions and various theories and models of attribution is the assumption of a relationship between a person's attributions and their behavior. More specifically, according to Weiner's Model (1972) not only do different attributions correlate with different behaviors, but changes in attributions also result in the modification of subsequent behaviors.

Evidence is available which indicates correlations between attributions and behavior. Weiner et al. (1971) and Weiner (1972) analyzed four types of achievement behaviors, i.e., free choice responses, persistence, performance intensity, and risk performance. These behavioral categories were derived from Atkinson's theory of achievement motivation (Atkinson, 1964). Data were analyzed based upon individual differences in high/low need for achievement. The results suggest that individuals with high need for achievement, (1) are more likely to choose to engage in achievement tasks (2) they are more inclined to persist longer in face of failure, (3) they perform with greater intensity, (4) they choose tasks of intermediate difficulty, and (5) they attribute performance outcomes more to internal and

controllable factors. Bar-Tal discusses the implications of these results and states that these correlations open the possibility for intervention, i.e., modifying causal attributions may affect subsequent behavior and performance (Bar-Tal, 1978, pp. 263-264).

Several studies have been conducted to empirically explore interventions which modify attributions and observe changes in behavior. Dweck (1975) hypothesized that children exhibiting patterns of helpless behavior who were taught to take responsibility for failure by attributing their failure to "effort" would exhibit improved performance in latter trials. Dweck compared the performance of these children to a comparable group of children who were exposed to success experiences only.

In this experiment an academic task was used, solving math problems. Both groups were pretested and then began training activities. Training was carried out for 25 daily sessions. Two major differences between the two groups occurred. First, children in the attribution training group had 12 to 13 success experiences and 2 to 3 failure experiences each day. Children in the success only group had 15 success experiences daily. And secondly, children in the attribution training group were told to "try harder" (training them to attribute failure to lack of "effort") during each scheduled failure performance.

The conclusions of this study state:

> The children who were taught to attribute failure during training to insufficient effort were able to persist after failure in the test situation. That failure became a clue to escalate effort is supported by the finding that five of the six subjects receiving the Attribution Treatment, in fact, showed superior performance following failure . . . .
>
> Contrary to initial expectations, however, the subjects in the success only treatment did not show any consistent improvement in their response to failure, but rather continued to display marked impairment of performance following failure. This occurred despite the fact that their performance during training and on non failure days during testing steadily improved (Dweck, 1975, p. 683).

Chapin and Dyck (1976) replicated Dweck's experiment using an improved design. This time the task was reading sentences, and the attribution training was similar to that found in Dweck's study. Children in this group were told, "That's very good, that means you tried hard" (effort attributions) following successes, and were told, "No you didn't get that, that means you should have tried harder," following failures. Chapin and Dyck (1976) found that atrribution training does facilitate both persistence and improved performance. However, they also found that the number of successive failures prior to success interacted with the findings on attribution training.

These two studies provide empirical evidence that attributions can be changed through instruction and that such changes in attributions are reflected in modifications of subsequent behavior. Based upon these findings, a similar treatment can be constructed to determine if attribution training will help patients improve their diabetic control.

Summary

This chapter reviewed the general medical literature on patient compliance, giving special attention to reports of compliance in Diabetic patients. Two factors appear to correlate with compliance, Regimen Difficulty, and patient's Health Beliefs. Responsibility and self-control aspects of compliance were discussed in relation to the potential application of attribution principles as a solution. The attribution literature related to self-control, attribution categories, misattributions and attribution training strategies were also reviewed.

CHAPTER III

METHODOLOGY

This chapter describes the methodology and procedures used in the present research. It contains three major sections. In the first section, the treatments are discussed in relation to the research design. The second section discusses the rationale for the pilot study and the methods used. The third section identifies the methodology used in the full study including procedures, responsibilities of participants, and measurement instruments.

The Treatments and the Research Design

The basic purposes of this research were to extend Attribution principles to the medical task of Diabetic Compliance, and to explore the process of Misattribution. Diabetic Control (DC) was the most important dependent variable. Based on previous research two factors have been identified as correlated with Diabetic Control, Regimen Difficulty (RD) and Health Beliefs (HB). These two factors were measured and included in this study as covariables. Patient's Psychological Attributions (PA) and Physical Attribution Errors (PAE) were studied in relation to

Diabetic Control. The major independent variable was Treatments (T).

The inclusion of the variables mentioned above in this research allowed the researcher to examine the major hypotheses of interest. The major hypotheses stated that patients who are given Attribution instruction in relation to their Diabetic condition would:

(1) exhibit better Diabetic Control than other patients;

(2) exhibit fewer Physical Attribution Errors than other patients; and

(3) exhibit more internal (effort) Psychological Attributions than other patients.

In order to test these hypotheses, three treatments were utilized. One third of the diabetic patients were to receive Attribution Instruction plus Feedback in relation to their diabetic control. One third were to receive only Feedback Instruction which was consistent with the Behavior Modification theoretical model, and one third were to receive standard medical care. This last treatment was composed of No-Physician-Contact unless the patient recognized problems and sought assistance.

These three treatments allowed comparisons to be made between patients receiving standard medical care for Diabetes, patients receiving Physician Feedback on their diabetic condition, and patients receiving both Feedback and Attribution Instruction in relation to their diabetic condition.

The design of this study called for the random assignment of patients to three treatment groups. Three physicians administered the treatments in a completely crossed and balanced design. Patients were equally exposed to other physicians during the pre- and post-tests.

The instrumentation and data collection procedures used in this study rely heavily on patient self reports by telephone. The decision to utilize self report methods was made with clear recognition of the inherent problems involved in this methodology. Both the Behavioral Science Literature and the Medical Literature (Stimson, 1974) identify problems involved in self report methodologies. Specifically, self reports arouse suspicions that subjects will report false data to boost their self concept, to avoid shame or guilt, or simply out of ignorance.

As this study was being designed, alternative methods were considered particularly in relation to the major outcome variable, Diabetic Control. Diabetic Control can be measured by methods other than patient self testing and self-reporting urine glucose and ketone results, self reports of hypo- and hyperglucemic reactions, and self reports of behavior consistent with DC. For example DC could be measured in the office or in the laboratory using urine or blood samples. Such measures may provide more reliable data on Diabetic Control, but at great expense. Patients would experience inconvenience in coming to the office or lab to have samples taken. Also the collection and analysis of

these samples would require a great financial burden for either the patient, the researcher, or the sponsoring agencies. The cost of this alternative outweighed the potential benefits, resulting in the reliance on the self reports methodology while special efforts were used to minimize the potential problems.

The Pilot Study Methodology

A pilot study was deemed necessary for two reasons. First, because the instrumentation of the study had not been previously used, a pilot study was needed to establish the feasibility of the instruments and to de-bug the data collection procedures. Secondly, the pilot study was conducted to establish the strength of the Attribution Treatments in the medical context. The pilot study did not include other treatments, but focused on establishing the Attribution Treatment as a feasible and potentially strong intervention to produce changes in the outcome variable.

The pilot study was conducted over a period of seven weeks. During the first two weeks of this time frame, the sample was selected and interviewed by a team of nurses, and each of the participants was trained to fulfill certain responsibilities. The third week was used to pretest all subjects while the fourth and fifth week were used for implementing the attribution treatment. During the sixth week there was no contact with any subjects, and in the

final week the post-test was conducted. Figure 3-A summarizes the pilot study activities.

Time Frame	Activities
Week 1 and 2	(1) Subjects selected (2) Training of responsibilities for nurses, office staff, pre/post test physicians, treatment physicians. (3) Nurses conduct home interviews
Week 3	Pretest conducted
Week 4 and 5	Attribution Treatment given to all patients
Week 6	No patient contact
Week 7	Post-test conducted

Figure 3-A.--Time Frame for Activities Used in the Pilot Study.

Pilot Sample

The subjects used in the Pilot were all between the ages of 20 and 60 years old. Each had been diagnosed as being diabetic for at least two years. All subjects were patients in an urban family practice ambulatory care center.

The nurses at the Family Practice Center generated a list of 21 patients from memory who conformed to the above parameters. The diabetic patients who appeared on

the nurses' list were patients who frequented the office with diabetic conditions which were problematic.

Nine patients, seven female and two male, were chosen from this list for the pilot study. These patients were further characterized as being volunteers. One female subject refused to continue participation in the study after two weeks.

Training Personnel

Five groups of people involved in the health care of diabetic patients were trained to fulfill responsibilities of the pilot study. The first group, nurses at the Family Practice Center, were trained for one and one half hours in the procedures to use in conducting the patient home interviews.

Nurses were trained to initiate the home interview with a phone call to patients inviting them to participate. They were then trained to conduct the home interview and fill out a short questionnaire immediately following the patient visit (for details, see Appendix A, "Pilot Study Nurse Training Procedures").

The office staff was trained to call patients on the phone and collect the initial data from them (DC, PAE, PA data). The office staff was instructed to give the DC data to the appropriate physician. The task of the office staff was consistent throughout the study (see Appendix A "Office Staff Training Procedures").

Three physicians received one hour of training for their responsibilities during the pre-test and post-test of the pilot. During this instruction the Pre/Post-test Physicians: (1) familiarized themselves with data collection instruments, (2) learned to review information presented and collect additional information from patients, (3) assessed the patient's success at Diabetic Control and its causes, and (4) learned to fill out the physician pre/post-test questionnaire (see Appendix A, "Pilot Study Pre/Post-test Physician Training").

The two treatment physicians received two hours of training for their responsibilities. They were trained to collect information and fill out similar questionnaires as described for pre/post-test physicians. They were also trained to implement the Attribution Treatment. Treatment physicians were to state that the patient's results indicated either success or nonsuccess, and direct the patient to attribute these results to <u>effort</u> or <u>ability</u> (see Appendix A, "Pilot Study Attribution Treatment Physician Training").

In order to assess Regimen Difficulty two physicians were trained to utilize information from the patient's office chart and from the nurse's home interview. During their training these two physicians first discussed and came to agreement on the criteria for judging RD. They reviewed a sample of six patients' regimens one at a time, made their assessment of regimen difficulty, and then discussed their decisions until they came to agreement.

The Nurse-Patient Home Interview

The home interviews were conducted in the first two weeks of the pilot. Each patient who agreed to be interviewed when first contacted by phone were visited by a nurse. The nurse carefully explained the purpose of the study, and the patient's responsibilities. She trained the patient to conduct urine tests, to respond to questions and record all necessary data. Each patient who agreed to participate signed a consent form. The patients were given a notebook containing an outline of their responsibilities and all daily questionnaires. Finally the nurse gave the patient the Health Belief Questionnaire (see Appendix B) to be completed during the interview.

Immediately upon completing the interview, the nurse filled out a short survey (see Appendix B). This questionnaire requested information about the patient's home, family, social and economic status. It was later used by the physicians who assessed the patient's RD.

The Pre-Test

During the pre-test week (week 3), each patient was contacted by phone on three weekdays. A trained member of the office staff initiated the phone call and collected data from each patient (see Appendix B). The office staff recorded data on DC, PA, and PAE in a booklet kept at the office. The pre-test physician was given data only on DC before talking to the patient. After reviewing this data,

the pre-test physician discussed the information on the phone with the patient. The purposes of the conversation were to collect sufficient information so that the pre-test physician could determine the patient's success at DC, and to enable the physician to determine the physical causes of the patient's DC results. After closing the phone conversation with the patient the physician filled out the questionnaire contained on the reverse side of the pre-test recording instrument (see Appendix B).

The Treatment

The Attribution Treatment was conducted during the fourth and fifth weeks of the Pilot. Patients were contacted by the office staff three times each week on alternating days. Once the office staff recorded the necessary information reported by the patient, one of the treatment physicians took the phone. The physician determined if the patient had been successful or unsuccessful in controlling their diabetes, then began the Attribution Training.

The first step in the Attribution Training was to provide the patient with feedback regarding their degree of success at DC. The physician stated: "Your urine tests and reports of reactions indicated that you are (are not) managing your Diabetes well. You needed to get ____ (results), and you got ____ (results). These results indicate that you were (were not) successful in controlling your diabetes today."

The second step in the Attribution instruction was designed to teach patients to attribute their DC results to Effort PAs. If the patient was successful, the physician states: "These successful results indicate that you have tried hard. You put forth the necessary effort to obtain these results and control your Diabetes."

If the patient was not successful, the physician discussed the diabetic regimen with the patient and if necessary modified it so the patient could be successful. The physician then stated: "The results which you got today indicate that you are not controlling your Diabetes well. Remember you want to get ____ (results). In order to do this you must try harder, put forth more effort to follow your treatment plan."

Following their initial Attribution Statements, physicians responded to questions and clarified their feedback at patient's requests. When the treatment physician felt that the patient clearly understood this discussion the phone call was ended. Physicians filled out their questionnaire and began the sequence with the next patient (see Appendix B for questionnaire).

No Contact and Post-Test

The sixth week was a week of no direct patient contact. No contacts were initiated by the Family Practice Center during this time. However, two physicians trained to assess RD completed their responsibilities during this week. Using the patient's office records and information

from the nurse home visit, both physicians independently rated all patient's regimens.

In the final week of the study (week 7), the post-test was conducted. The post-test was conducted in exactly the manner as the pre-test. The same physicians who were involved in the pre-test also completed post-test activities.

Pilot Study Instruments

The instruments used in the pilot study were developed to measure the variables of interest, (1) Health Beliefs (HB), (2) Regimen Difficulty (RD), (3) Diabetic Control (DC), (4) Physical Attribution Errors (PAE), and (5) Psychological Attribution (PA).

Patients' HB were measured using a 55 item questionnaire which was filled out during the Nurse Home Interview. The items for this questionnaire were developed based on Becker's (1976) theoretical constructs of Patient Compliance and Health Beliefs. As was previously stated, patients whose beliefs are more consistent with the following statements tend also to be more compliant:

(1) My illness makes me susceptible to further complications if I do not follow my treatment plans.

(2) The consequences of my illness can be severe unless controlled.

(3) My treatment plans are effective in helping me control my disease.

(4) There are no major obstacles to compliance with my treatment plans.

Three types of questions were used to measure HB in the Pilot Study. Twenty questions used the Likert Scale response type format. A sample question using this format is:

(1) "I would have to change too many habits to follow my Diabetic treatment plans."

SA A U D SD

A variation of this scale type format was used to measure how severe the patient believed his Diabetes to be. For example:

(25) When you compare Diabetes with the Flu, Diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

The third item type was of the true/false variety. These were used to measure the patient's knowledge of the diabetic condition. For example:

(29) "In order to control Diabetes it is very important to follow your diet carefully."

TRUE FALSE

The full HB Pilot Study Questionnaire can be found in Appendix B.

The second variable, RD, was assessed to two trained physicians who utilized information from the nurse home interviews and the patient's office records to fill out a short five item questionnaire.

They were told to indicate how difficult each of the five factors (Diet, Medication, Exercise, General Health, and Stress) make the diabetic regimen prescribed for each

patient. A 10 point scale was used with "Very Easy" rated 1 and "Very Difficult" rated 10. Both physicians were trained to assess RD according to the training procedures described earlier.

DC was measured by six items reported to the office staff each day by the patient. Patients were instructed by the nurse during the home interview regarding how to test their urine for glucose and ketones. They were also trained to record and report these results. They were instructed to test their urine at least twice per day throughout the study. All patients were provided with urine testing materials supplied by the Ames [C] Company (Free & Free, 1972) which had well documented reliability and validity (James & Chase, 1974; Court et al., 1972).

Four of the six questions measuring DC were related to these urine tests. Patients were asked to record the time of their first urine test, and then answer the following questions:

What was your glucose test result?

___Negative ___Trace ___+ ___++ ___+++ ___++++

What was your ketone test result?

___Negative ___Trace ___+ ___++ ___+++ ___++++

The third question used to assess DC was related to frequency of hypoglycemic and hyperglycemic reactions. As previously stated these two types of reactions are easy to identify by the diabetic patient. When a patient is having one of these reactions, s/he experiences dramatic

bodily sensations which will escalate dramatically unless the patient reacts appropriately. The patients were asked:

> "How many reactions did you have since you last recorded your results?"
>
> ___None (0) ___One (1) ___Two (2) ___Three or more (3+)

The patient was asked to record the time of their second urine test, and answer the same three questions. Taken together these six questions answered daily were the basis for the DC score in the Pilot Study.

Physical Attribution Errors measured the extent of agreement between patient's and physician's estimates of the importance of the five physical factors (Diet, Medication, Exercise, General Health and Stress) in causing the DC results for that day. Patients and physicians were asked to independently identify how important each factor was in causing Diabetic Control Results. The individual rated its importance on a scale from 1 (not important) to 5 (very important). For example:

> Indicate how important each factor is in causing the results obtained today:
>
> Diet: Not important 1 2 3 4 5 Very important
>
> Medication: Not important 1 2 3 4 5 Very important

Thus each factor was rated by both the patient and the physician (see Appendix B for full PAE question battery). Physician scores were considered "correct" and the difference between patient scores and physician scores indicated the degree of error in Physical Attribution.

PAs were measured using six items developed from Weiner's Attribution model. This model proposed four major attributions: Ability, Effort, Task Difficulty and Luck. A paired comparison format was selected to assess these factors. Patients were asked to select the one option from the pair which most affected their results for that day. Six items were used so that each of the four factors was paired against its remaining three counterparts. Ability attributions were identified by the statement "The results are mostly because of how well I am able to perform the task"; Effort was identified by the statement "The results are mostly because of how hard I tried"; Task Difficulty by the statement "The results are mostly because of how easy or difficult the task is"; and Luck by the statement "The results are mostly because of how my luck went today."

Using the paired comparisons format the researcher could determine how frequently each of the PAs was identified as a cause (for a complete list of PA questions used in the Pilot Study, see Appendix B).

The methodology and results observed in the pilot study provided the foundation for the full study. The pilot study results are briefly described below to add perspective to the modification made in the methodology of the full study. (For full details of the Pilot Study results, refer to Chapter IV.)

Pilot Study results for Health Beliefs (HB) demonstrated that numerous questions did not discriminate between patients well. The HB scores ranged between 101 and 133 for the eight Pilot Study patients. Regimen difficulty results in the pilot study were reliable and ranged from 31 to 59, indicating that this variable was being measured adequately and accurately. Diabetic Control (DC) results observed in the pilot study indicated that five subjects improved between pre-test and post-test, however there were no measures of behaviors related to DC utilized in the pilot study. Physical Attribution Errors (PAE) as measured in the pilot study and the corresponding results were very unreliable. Dramatic inconsistencies in PAE between physicians suggested that the methodology for measuring this variable needed modification. Finally, Psychological Attribution (PA) results indicated that patients' attributions could be measured and did change over the course of the study. These results were true for ability, effort, task difficulty and luck PAs.

The Full Study Methodology

As a result of the Pilot Study experience certain adjustments were made in the Full Study. The Health Belief Questionnaire was shortened to include only items which discriminated between patients. The Diabetic Control measure was lengthened to include items regarding behaviors associated with good/poor control. The Physical Attribution

Error instrument changed from a Likert format to a Rank-Order format. All other instruments remained essentially unchanged. However, physicians were trained to use a decision making flow chart in assessing Physical Attribution Errors (to improve reliability) and certain adjustments were made in the treatment activities. All changes are described in detail later in this report.

The time table for the Full Study was the same as that of the Pilot Study. Weeks one and two were devoted to training personnel, and conducting the home interview; Week three was designated for pre-test activities; Weeks four and five were devoted to implementing the treatments. During week six there was no patient contact but RD was assessed as in the Pilot. And finally week seven was used to conduct the post-test.

Sample

A population of Diabetic patients was identified from two Family Practice ambulatory care centers, 120 from a predominantly urban area and 50 from a predominantly rural area. The two Family Practice Centers were also sites of a Family Practice Residency Program.[1] Together they are staffed by five physician directors and 22 resident physician, and

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[1]The author is indebted to the staff of the E. W. Sparrow Hospital Family Practice Residency Program. The office staff, nurses, residents, faculty and especially the patients of this facility were most cooperative and helpful throughout the study. It is also noteworthy that these individuals accomplished everything requested of them while maintaining the daily activities of a busy medical practice.

closely associated with a major urban 500 bed hospital and a rural 35 bed hospital.

Patient charts were reviewed to screen patients who did not meet age and "time-since-diagnosis" requirements. Thirty-nine patients were found to be clinically active diabetics. Twenty-eight patients were ultimately selected and consented to be in the Full Study. One patient dropped out after five days because he was consistently unavailable. The remaining twenty-seven patients participated in the study. Sixteen were female, and eleven were male. The average age was 51 with a range from 24 to 60 years old. Patients failed to report daily results in pre and post-test weeks on only six occasions.

Training of Personnel

Five groups of personnel (nurses, office staff, pre/post-test physicians, treatment physicians and regimen difficulty physicians) were trained to fulfill their responsibilities. The training of nurses, office staff, and regimen difficulty physicians for the Full Study followed the same pattern described earlier for the Pilot Study (see pages 41-42).

As a result of experience in the Pilot Study, Pre/Post-test Physicians and Treatment Physicians responsibilities and training changed significantly. Treatment physicians' responsibilities also changed because they were required to implement three different treatments (Attribution plus Feedback, Feedback Only and No Contact).

During the Pilot Study Pre-test/Post-test and Treatment Physicians had difficulty in assessing the Physical Attributions of the patient's reliabily. Given similar information from individual patients, the physicians came to different conclusions about which physical factors were contributing to Diabetic Control results. The confusion which came from this problem is considered serious both in terms of providing the consistent feedback for patients' learning, and in terms of obtaining reliability for the PAE measure. Numerous solutions were explored during the remainder of the pilot, resulting in the development of a decision making protocol in flow chart form for implementation in the Full Study (Appendix C).

The Attribution Treatment was modified to include instruction on PAEs as well as PAs and Diabetic Control Feedback previously discussed. The physicians involved received appropriate training to fulfill this added responsibility.

Treatment physicians were trained to provide feedback on DC to patients assigned to Feedback Only treatment. These physicians were also trained to handle patients assigned to the No Contact group.

The Nurse-Patient Home Interview

Seven nurses conducted the home interviews. As was true in the Pilot Study, patients were contacted initially by phone and if they agreed a home interview was arranged.

During the home interviews, the nurses followed the same procedure and activities as described earlier for the Pilot Study. However, because a number of instruments used were changed for the Full Study, slight modifications were made by the nurses. Nurses filled out a brief questionnaire immediately after the completion of the interview. All 28 interviews were completed the first two weeks of the Full Study.

The Pre-Test

Three trained physicians conducted the pre-test. Twenty-seven patients were contacted three times during the pre-test week. The patients reported the required data to the office staff and talked to the assigned physicians as previously described. Pre-test physicians were blind to the Treatment Patient Assignments.

The Treatment

Patients were randomly assigned to the three treatments and physicians. This assignment of patients to treatments and physicians resulted in a completely crossed and balanced design (Figure 3-B).

Patients in the No Physician Contact group had no direct contact initiated by the Treatment Physicians. They were called three times per week during the treatment weeks (weeks 4 and 5) by the office staff. They reported the exact same information as all other patients. They were also informed at the beginning of the Treatment Weeks that they

Treatment	Physician	Patient
No Physician Contact	A	1-3
	B	4-6
	C	7-9
Feedback Only	A	10-12
	B	13-15
	C	16-18
Attribution Plus Feedback	A	19-21
	B	22-24
	C	25-27

Figure 3-B.--Patient's Assignments.

could speak with a physician, but that they would have to initiate such contacts. None of the subjects exercised this option during the Treatment Weeks.

Patients in the Feedback Only group did have contact with their assigned physician. Phone calls were initiated and information was reported to the office staff prior to the physician contact. After reviewing the relevant information the physicians talked briefly with these patients to collect any additional data needed to decide if the patient had been successful (or not successful) in DC for that day.

Depending on whether the assigned physicians assessed DC to be successful (or not successful) s/he stated: "Your urine tests results, reaction reports and eating habits indicate that you are (are not) managing your Diabetes well. You needed to get ___ (results) and you got ___ (results). This indicates that today you were successful (not successful) in controlling your Diabetes."

Physicians were encouraged to proceed with their normal patient management process, recommending regimen changes consistent with their best medical judgement. When they completed this process and were convinced that the patient clearly understood the feedback, the phone contact was ended.

Patients in the Attribution Plus Feedback group received phone calls from the office staff and reported the appropriate information in a similar manner as all other

patients. The assigned physician then took over the phone and proceeded following the exact same feedback procedures described for patients in the Feedback Only group. However, before ending the phone contact these patients also received Attribution Instruction.

The Attribution Instruction provided to patients in this group differed from that of the Pilot Study. Patients were first given instruction to help them learn to attribute their DC results to internal psychological causes, primarily effort. Secondly, they were given instruction to help them learn to identify the two primary physical causes of their Diabetic Control results.

When the assigned physician determined that the patient had been successful in DC and provided the patient with corresponding feedback, the physician stated: "These successful results indicate that you have tried very hard, that you put forth the effort needed to control your Diabetes today." Then the physician stated the two primary physical causes for successful Diabetic Control results: e.g., "You obtained successful results today because you followed your diet carefully and took the appropriate medication."

Patients whose DC results indicated nonsuccess received different instruction. When the assigned physician determined patient's nonsuccess and provided the corresponding feedback, the physician clarified and simplified the patient's regimen. This was done to insure that the patient could obtain successful results. The physician

proceeded by stating: "The results which you obtained today indicated that you are not controlling your Diabetes well. Remember you want to get ___ results. In order to do this you must try real hard, put forth more effort to follow your treatment plan." Finally the physician identified the two most important physical causes for the nonsuccessful results stating (for example) "The results which you obtained today indicating you did not control your Diabetes well probably occurred because you did not follow your diet well or because you did not obtain the exercise which you needed." After clarifying the feedback and instruction so that the patient understood, the phone call was completed.

Throughout the treatment phase of this study, physicians were periodically monitored by the researcher as they fulfilled their responsibilities. Appropriate feedback was given to the physicians. Usually this took the form of encouragement for strictly following the outlined activities. Occasional suggestions were made to physicians who were deviating from established protocols. Physicians also indicated how well they felt they had administered the treatments for each patient by answering a question included on their daily questionnaire. Of the 108 patient contacts during the Treatment phase of the study, physicians identified only three contacts where they had difficulty in providing the correct instruction.

Figure 3-C summarizes the activities of the three treatment groups. The No Physician Contact group reported

Activity / Treatment Group	Report Results and Information	Feedback Instruction	Attribution Instruction
No Contact	Yes	No	No
Feedback Only	Yes	Yes	No
Attribution Plus Feedback	Yes	Yes	Yes

Figure 3-C.--Treatment Groups' Activities.

results and information to the office staff but had no contact with physicians during treatment weeks four and five. The Feedback Only group reported results and information, and were given feedback on their DC results by assigned physicians. The Attribution Plus Feedback group reported results, were given corresponding feedback and were given instruction on the physical and psychological causes of their Diabetic Control results by the assigned physicians.

No Contact and Post-Test Weeks

During the sixth week no patients were contacted by the Family Practice Center. Patients were asked to continue with their previously identified activities, fill out the forms for this week in their booklet, and follow the regimen prescribed by their physician. Patients were told to feel free to contact the office if they had questions or problems regarding their health. None of the patients in the study exercised this option.

The post-test was conducted in exactly the same manner and with the same physicians as was the pre-test. Data was collected from patients on three days during this week. DC, PAE, and PA data was collected from patients. Post-test physicians added data on DC and PAE.

The Full Study Instruments

As was previously true of the Pilot Study, the instruments used in the Full Study measured the following variables: (1) Health Belief, (2) Regimen Difficulty,

(3) Diabetic Control, (4) Errors in Physical Attribution, and (5) Psychological Attributions. Some of these variables were measured using instruments which were slightly modified from those of the Pilot Study, while others were changed substantially.

As a result of the experience gained in the Pilot Study, patients' Health Beliefs (HB) were measured using a shorter questionnaire (31 items). All of these items followed the Likert Scale response type format to measure patient's Health Beliefs as described by Becker (1976), and patient's knowledge of Diabetes (see Appendix D for the Full Study HB Questionnaire). The most discriminating items from the Pilot Study were selected and Modified to complete the Full Study HB Questionnaire.

Regimen Difficulty was assessed in the Full Study using the same procedures and instruments found in the Pilot Study.

The measurement of the variable Diabetic Control (DC) changed substantially as a result of experience in the Pilot Study. The five items measuring urine glucose, ketone and frequency of reactions were retained as they appeared in the Pilot Study. However, an additional nine (9) behavioral items were added to the DC instrument.

Eight of these items asked the patient to report the frequency of specific foods consumed. These foods are typically forbidden from a diabetic patient's diet. The eight specific forbidden food categories assessed were:

(1) candy, (2) cake, pie, donuts, (3) sugar, (4) sugar sweet pop, (5) wine or liquor, (6) other foods containing sugar, (7) other foods not on your diet, and (8) between meal snacks. The format used to record and report the frequency of eating these forbidden foods was a multiple choice type format. For example:

Indicate how many times you ate each of the foods today:

Candy: __0 __1 __2 __3 or more
Cake, pie, donut: __0 __1 __2 __3 or more

The final item used to measure DC was to be answered by the physician assigned to each patient. After reviewing the data reported and discussing the details with the patient during the phone conversation the physician was to indicate how successful the patient was for that day in controlling his/her diabetes. The physician used the following item to record his assessment:

"I would consider this patient's results today ____"

Very Successful 1 2 3 4 5 6 7 8 9 10 Very UNsuccessful

The DC instrument was composed of three types of items. Five items measured the patient's glucose, ketone and frequency of reactions. Eight additional items measured the frequency of forbidden food consumption, and one additional item measured the assigned physician's assessment of DC.

Physical Attribution Errors (PAE) for the Full Study was measured by a five item rank order format given to both the patient and the assigned physician. A list of the

five physical factors which have a causal relationship to DC was provided. The patient and assigned physician were asked to rank these factors from the "factor most responsible for today's results" to the "factor least responsible for today's results" (see Appendix D).

The physician ranking of each factor was considered the criterion. The difference between physician and patient rankings indicated the degree of error.

Psychological Attributions (PA) in the Full Study were measured using essentially the same items and procedures as described in the Pilot Study.

In the next chapter, the Analysis and Results will be described in detail for both the Pilot Study and the Full Study. The five variables of importance will be covered: Diabetic Control, Health Beliefs, Regimen Difficulty, Psychological Attributions, and Physical Attribution Errors.

CHAPTER IV

RESULTS

This chapter describes the results of the study in two major sections. The first section addresses the scoring of the five variables used in the Pilot Study and the results found for each variable. The second section describes the scoring of the Full Study variables, the analysis, and the results associated with these variables.

Pilot Study Results

The Pilot Study was conducted for two major purposes: (1) to establish the Attribution Treatment as a potentially strong intervention in causing changes in the major outcome variables, and (2) to refine the instruments used to measure the variables of interest. The results of the Pilot Study were compiled, scored and analyzed using simple hand calculations in order to accomplish these goals. Five major variables were addressed: Health Beliefs, Regimen Difficulty, Diabetic Control, Errors in Physical Attributions, and Psychological Attributions. Three daily reports were scheduled during both pre- and post-test weeks for each patient (total = 48 daily reports). Patients failed to

report daily results on six occasions. Data was averaged over the daily reports for both pre- and post-test weeks to correct for missing values.

Health Beliefs

Health Beliefs (HB) were measured using a 55 item questionnaire as previously described. True/false items were scored one point for correct answers and zero for incorrect answers. Answers to Likert type items were scored higher (5 points) for answers consistent with the Beliefs of Compliance as described by Becker's Health Belief Model (Becker et al., 1977).

The eight subjects participating in the Pilot Study received HB scores ranging from 101 to 133 (see Table 4-A). This relatively narrow range of HB scores suggested that many items were answered similarly by all pilot subjects and indicated that numerous items did not discriminate between subjects well.

Regimen Difficulty

The five items used to measure Regimen Difficulty (RD) were scored on a scale of 1 to 10. Low scores indicated easy regimens for the Diabetic Patients and high scores indicated difficult regimens. Two trained physicians independently answered the RD questionnaire for each patient providing a measure of reliability. Of the possible 40 RD assessments (5 items for each of 8 patients), the two

Table 4-A.--Pilot Study Results by Subject and Variable.*

Subject	HB	RD	DC**	PAE**	Psychological Attributions			
					Ability**	Effort**	Task Diff.**	Luck**
1	127	56	0.333	4.2	0.1666	-0.0833	-0.0833	0.0
2	121	56	0.0	3.1	-0.1111	0.0556	0.0556	0.0
3	112	50	0.333	6.7	-0.0556	0.1111	0.0556	-0.1111
4	121	52	0.0	-19.0	0.0	0.0556	-0.0556	0.0
5	132	50	0.333	7.0	0.0	0.0	0.0	0.0
6	101	58	0.0	4.3	0.0278	-0.0556	-0.0556	0.0833
7	117	31	3.666	-15.6	0.0833	-0.0833	-0.0278	-0.1389
8	133	54	7.333	-14.4	0.2222	-0.1660	0.0	-0.0556

*See text for computation of variable scores and units of measure.

**Values reported for these variables are change scores (Pre-test - Post-test).

physicians were within one point of agreement on 39. Scores ranged from a low of 31 (easiest regimen) to 56 (most difficult regimen) (see Table 4-A for results).

Diabetic Control

Diabetic Control (DC) is considered the most important outcome variable, and was measured by recording daily reports of urine glucose and ketone levels, and frequency of reactions. Low scores indicated good control, while high scores indicated poor control.

Daily scores were obtained by recording the results reported by the patient, and totaling these daily reports across all DC items. Weekly scores were obtained by averaging daily reports obtained during a given week.

As previously stated, one purpose of the Pilot Study was to determine the strength of the causal relationship between the Attribution Treatment and Diabetic Control (if any). In order to determine if patients improved on DC, week 5 scores were subtracted from week 1 scores.

The results indicated that five patients showed improvement. Three patients showed only slight improvement, two showed marked improvement. None of the patients receiving Attribution Instruction showed a worsening of DC (see Table 4-A).

The Pilot Study DC instruments were designed to measure only the physical outcomes of behavior which contribute to good or poor Diabetic Control. No behaviors

related to DC were assessed. This presented a problem because the sole reliance on physical outcome measures may mask behavioral changes consistent with control of a patient's diabetes. The credence given to this argument led the researcher to incorporate a series of behavioral measures and general assessments of Diabetic Control into the DC measures used in the Full Study.

Physical Attribution Errors

In order to determine PAE, physicians' assessment of the importance of the five physical causes were used as the correct or criterion scores. Patient's assessments of the importance of these causes were subtracted from the physician's assessments indicating the degree of error. These differences were squared to obtain a positive value for each day that reports were made. Weekly average scores were calculated. The week 5 (post-test) PAE score was subtracted from the week 1 (pre-test) PAE score to determine if the treatment resulted in improvements.

Five patients showed slight improvement in PAE (+1.3 to +7.0). Three patients showed a higher rate of errors during the post-test (-14.4 to -19.0) (see Table 4-A).

As mentioned earlier a serious problem was identified during the Pilot Study in regards to the PAE instrumentation. The physicians conducting pre/post-tests and treatments demonstrated wide inconsistency and unreliability in identifying the physical causes of patients'

daily DC results. The lack of reliability observed with the PAE variable made these scores meaningless. This problem led to the need for better training and refinement of the PAE instruments for the Full Study.

Psychological Attributions

Psychological Attributions (PA) were measured using six paired comparison type items. Each time a patient selected one PA category over its counterpart one point was scored for that category. A total of six PA points were allocated for each patient each day. Scores were averaged over a week according to the number of days the patient reported results. In order to find out if the patient changed their PA, scores for each PA category from week 1 were subtracted from those of week 5.

The Pilot Study results show that of the eight patients, four attributed more to ability during the post-test, two attributed less to ability during the post-test, and two did not change in frequency of ability attributions. Results for "effort" attributions indicated four patients attributed more, three attributed less and one did not change from pre-test to post-test. For "task difficulty" two patients attributed more, four attributed less and two did not change their frequency of task difficulty attributions. Finally regarding "luck" attributions, one attributed more, three attributed less and four patients' luck attributions remained unchanged (see Table 4-A).

The Full Study

As a result of the experience gained in the Pilot Study, numerous adjustments were made in the instruments and treatments, and a more sophisticated approach was taken in the design and analysis of this data. This section will begin with a presentation of the scoring and actual results for each variable in the Full Study. The research design and analysis will then be discussed in detail.

Diabetic Control

Diabetic Control (DC) was the major dependent variable used in this study. It was measured by self reports of: (1) urine glucose and ketone tests, (2) hyper/hypoglycemic reactions, (3) consumption of forbidden foods, and (4) independent physicians' ratings of Diabetic Control. Each of these factors was scored so that higher values indicated poor control of the Diabetic Condition. Reports of urine test results, frequency of reactions, physicians' assessments were weighed twice as much as the reports of consumption of forbidden foods. The rationale for this weighting was that the three factors weighed higher are more objective and clearly defined. The factor "consumption of forbidden foods" involves self-report of patient noncompliant behaviors. Although they are important measures of patient behaviors, such self-reports are particularly open to being distorted by the patient.

Daily scores for all DC factors were averaged over the week to give a pre-test DC score ($\bar{X}$ = 12.38; sd = 12.51), and post-test scores ($\bar{X}$ = 10.21; sd = 8.50; see Table 4-B). Theoretically DC scores can range from 1 to 55. The DC scores observed ranged from 2.00 to 48.66 on the pre-test and from 2.00 to 33.66 on the post-test. Pre-test DC scores correlated with post-test DC scores (r = .77, see Table 4-C), indicating that there is a fairly stable positive relationship in DC over a five week period. However, some patients' DC scores did change dramatically in this period of time. Regimen difficulty correlated with DC in both the pre-test (r = .33) and post-test (r = .33) at significant levels, indicating a marginal but stable relationship between these variables. Table 4-C also shows that DC in the pre-test was negatively correlated with pre-test ability Attribution (r = -.36) but in the post-test no correlations with any of the four Psychological Attributions approached significance.

The results obtained for DC in this study demonstrates an improvement in measuring this variable compared to previous research. Other researchers (Spaulding & Spaulding, 1976) attempted to measure DC using similar factors, but found great difficulty in obtaining consistently reliable results because patients could not remember daily results when asked to report them at weekly office visits. Spaulding and Spaulding did not utilize any behavioral factors in their study (i.e., consumption of forbidden

Table 4-B.--Means and Standard Deviations for All Variables of the Full Study by Treatment Groups.

		Pre-test				Post-test			
		Control Group	Feedback Group	Attribution Group	Total	Control Group	Feedback Group	Attribution Group	Total
HB	$\bar{X}$	56.89	61.44	63.67	60.67				
	sd	15.33	9.96	5.61	10.99				
	n	9.00	9.00	9.00	27.00				
RD	$\bar{X}$	16.39	22.33	18.11	18.94				
	sd	4.51	6.50	3.16	5.27				
	n	9.00	9.00	9.00	27.00				
PAE	$\bar{X}$	11.48	6.22	10.15	9.28	5.69	5.80	6.96	6.15
	sd	6.83	6.79	8.21	7.38	5.17	5.89	7.21	7.94
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00
DC	$\bar{X}$	10.28	14.19	12.69	12.38	8.59	10.37	11.67	10.21
	sd	9.58	16.14	12.14	12.51	6.79	8.68	10.40	8.50
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00
PA-Effort	$\bar{X}$	1.59	1.63	1.82	1.68	1.67	1.48	2.28	1.81
	sd	1.02	0.66	0.67	0.78	1.33	0.93	0.73	1.05
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00
PA-Ability	$\bar{X}$	1.59	1.82	2.15	1.85	1.89	2.07	2.04	2.00
	sd	0.46	0.85	0.77	0.72	0.71	0.49	0.79	0.65
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00

Table 4-B.--Continued.

		Pre-test				Post-test			
		Control Group	Feedback Group	Attribution Group	Total	Control Group	Feedback Group	Attribution Group	Total
PA-Task Difficulty	$\bar{X}$	1.89	1.78	1.82	1.83	1.63	1.93	1.65	1.74
	sd	0.73	0.80	0.50	0.66	0.66	0.85	0.67	0.71
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00
PA-Luck	$\bar{X}$	0.93	0.78	0.22	0.64	0.81	0.52	0.04	0.46
	sd	1.06	0.99	0.55	0.92	1.18	0.78	0.11	0.85
	n	9.00	9.00	9.00	27.00	9.00	9.00	9.00	27.00

Table 4-C.--Correlation Matrix of Major Variables for the Full Study.

		Pre-Test								Post-Test					
		HB	RD	PAE	DC	Effort	Ability	Task Diff.	Luck	PAE	DC	Effort	Ability	Task Diff.	Luck
	Health Belief	1.00													
	Regimen Diff.	-.04	1.00												
Pre-Test	PAE	-.30	-.16	1.00											
Pre-Test	DC	-.13	.33	.37	1.00										
Pre-Test	Effort	.21	.24	-.19	.12	1.00									
Pre-Test	Ability	.34	-.20	-.44	-.36	-.16	1.00								
Pre-Test	Task Diff.	.12	-.34	.25	-.03	-.29	-.26	1.00							
Pre-Test	Luck	-.54	.20	.33	.21	-.51	-.46	-.28	1.00						
Post-Test	PAE	-.14	.17	.46	.52	-.22	-.34	.01	.44	1.00					
Post-Test	DC	-.00	.33	.29	.77	.11	-.44	.11	.17	.56	1.00				
Post-Test	Effort	.28	.10	-.05	-.08	.60	.04	-.13	-.45	-.17	-.01	1.00			
Post-Test	Ability	.15	.09	.04	.34	-.04	.30	-.06	-.16	.14	.30	-.26	1.00		
Post-Test	Task Diff.	-.11	-.27	-.14	-.18	-.40	.08	.42	-.04	-.35	-.29	-.44	-.31	1.00	
Post-Test	Luck	-.37	.03	.15	-.12	-.38	-.34	-.15	.70	.39	.03	-.66	-.18	-.06	1.00

foods), but relied solely on urine test results and frequency of reactions.

Lowery and DuCette (1976) in a study of Diabetic Control and Locus of Control utilized incidence of elevated fasting blood sugar, infection, hyper/hypoglycemic episodes, weight gain and missed appointments to measure Diabetic Control. This information was collected from patient records. They were able to detect significant main effects for length of Diabetic illness and interaction effects for Locus of Control using this measure. Lowery and DuCette also argue that "At least two of these factors, weight gain and missed appointments, were assumed to be fairly direct indications of patient's behavior in relation to the prescribed regimen" (1976, p. 360).

Numerous studies have been conducted on the urine testing aspects measuring DC. Traisman and Greenwood (1973) found that with highly trained subjects only 3.5% errors were made in testing and reporting urine glucose and ketone results. However, Shenfeld and Steel (1977) observed 70% errors with 100 subjects who were given little or no training.

Although self-report methodology used throughout this study leaves numerous questions, the measurement of DC used here seems to be an improvement over previous efforts given the initial training conducted by nurses during the home visit, the frequent interaction with physicians, and the consistent follow-up contacts used in the study.

Physical Attribution Errors

Physical Attribution Errors (PAE) were measured using a series of items asking for a ranking of the physical factors involved in Diabetic Control Results. These items were responded to by both the patient and the physician. Physician responses were considered the correct or criterion response and patient responses were subtracted from these to indicate the degree of agreement or Error which the patient was making. These values were squared and average scores for PAE were computed for both pre-test and post-test weeks.

Pre-test PAE resulted in a mean of 9.28 and a standard deviation of 7.38. Post-test PAE scores resulted in a mean of 6.15 and a standard deviation of 7.94 (see Table 4-B). Theoretically the PAE scores can range from 0 to 80. Pre-test and post-test PAE scores were correlated at .46, again indicating some degree of consistency over the five week period of the study. The actual pre-test scores ranged from 24.00 (indicating numerous or large attributional errors) to 0.66 (indicating minimal attributional errors). Similarly the post-test PAE scores ranged from 19.33 to 0.00. Two subjects' post-test scores of 0.00 indicated that they completely agreed with their physician about the ranking of physical factors as causes for their daily DC results.

The variable PAE is unique to this study. However, numerous researchers of Attribution Theory (Bem, 1967; Heider, 1958) have recognized the importance of Attributional errors

as a topic of study, and as a confounding variable in Attribution research.

The present study provides a method of measuring Attributional Errors in a field where causal relationships are well established and (sometimes) easily brought to consensus. The major problem with measuring PAE in this study was that individual physicians assumed their peers all agreed with them on these causal relationships, when in fact there were differences. This problem was resolved by developing the decision making flow chart, training the participating physicians, and reinforcing its use throughout the study.

Keeping in mind that high PAE scores indicate frequent large errors, and that high DC scores indicate poor control, there are some interesting correlations between these two variables. Pre-test PAE scores correlated with pretest DC scores at a level of marginal significance ($r = .37$; see Table 4-C). We would expect these correlations to be larger because frequent or large errors in attributions to physical causes should result in poorer control of the Diabetic Condition.

Contrast the correlations of pre-test PAE to those observed for post-test PAE. Diabetic Control scores during the pre-test correlated with post-test PAE scores ($r = .52$).

Post-test DC scores also showed a positive and significant correlation (+.56, see Table 4-C) with post-test

PAE scores. These observed correlations indicate a stronger relationship and are more in line with expectations.

Psychological Attributions

Psychological Attributions (PA) scores were obtained by counting how frequently each of the four attribution categories were selected in the six paired comparison items. Pre-test and post-test scores for effort, ability, task difficulty and luck were obtained by averaging the daily results during these weeks (see Table 4-B for means and standard deviations). Theoretically scores for each of the PA factors can range from 0 to 3.

High scores for each of these variables indicate that patients chose one Psychological Attribution category as a causal explanation for their DC results more frequently than others. Pre-test effort correlated with post-test effort ($r = .60$, significant at $\bar{p} < .01$). Task difficulty and Luck score correlations between pre- and post-test were .42 and .69 respectively. Correlations for pre- and post-test Ability attributions were nonsignificant but positive ($r = .30$, see Table 4-C).

These correlations suggest that the subjects in this study maintained fairly stable psychological attribution patterns over the five weeks of this study. Given these correlation patterns, it appears that participation in this study did not affect patient's psychological attributions. Further discussion of psychological attributions in relation

to the treatment groups will occur in the section on analysis of treatment effects.

Elig and Frieze (1975), in an article discussing the various methods of measuring Psychological Attributions, state that paired comparison Ipsative measures such as those used in this study "are measures in which the scores of one attribution must influence the score of other attributions, thus inducing negative correlations" (Elig & Frieze, 1975, p. 623). In fact the correlations between all pre-test Psychological attributions in the present study were negative. The same is true of post-test psychological attribution correlations (see Table 4-C). Statistically significant negative correlations on the pre-test were observed for Effort-Luck ($r = -.51$) and for Ability-Luck ($r = -.46$). In the post-test, statistically significant negative correlations were found for Effort-Task Difficulty ($r = -.44$), for Effort-Luck ($r = -.66$) and for Ability-Task Difficulty ($r = -.31$). Thus the data in this study lends support to the assertion presented by Elig and Frieze.

Reports from the office staff who initially contacted patients, requested and recorded responses suggest that patients were frequently confused by the PA items. They frequently did not understand how to answer these items, questioned the relevance of these items, or stated that "they seemed to be arbitrary" (as one office assistant described the patient reactions) in their response.

Two possible explanations for this anecdotal observation readily came to mind. First, it seems probable that the method of measuring the PA variables was confusing or inappropriate. If this is true, other methods should be considered in future studies. Secondly, the typical patient may simply not expect the physician to be interested in the psychological factors involved in health. Thus questions about psycho-social aspects of health may be considered "odd." If this second explanation is true, the new generation of physicians who have had more training in the psycho-social aspects of medicine may encounter patient resistance or confusion.

Regimen Difficulty

Regimen Difficulty (RD) was measured using five items each scored on a ten point scale. Low scores indicated easy regimens, while high scores indicated difficult items. Each patient's regimen was assessed independently by two physicians and an average RD score was computed.

The independent ratings of RD by the two physicians correlated at .98, suggesting high reliability. One explanation for this high reliability is that physicians ranking RD had much control over the task and their own training. During the training session (approximately two hours) the physicians were given a singular goal "to have maximum agreement on all ratings." The research coordinator suggested that the physicians review the RD items and come

to agreement on criteria for ratings, and then practice on a sample of Diabetic Regimens. They were told to rate these regimens independently, then show each other their ratings, explain their rationale for ratings, and come to consensus. Through this training process they developed high consistency thus illustrating a successful method for obtaining high inter-rater reliability.

The mean for RD was 18.94, and the standard deviation was 5.27. Theoretically RD scores can range from 5 to 50. RD scores ranged from 7.50 to 23.00. RD showed marginally positive correlations ($r = .33$, $p < .05$) with both pre- and post-test DC suggesting that as regimens become more difficult, so did control of the Diabetic Condition.

Numerous other studies have shown similar results indicating that the type of regimen, and its complexity affect outcome measures of compliance. Francis et al. (1969) found statistically significant correlations between noncompliance and two measures of regimen complexity. In his study, patients on regimens requiring three or more medicines or both medicines and behavior changes demonstrate overall compliance decreased to 25% while the compliance for the total sample was 42%. Davis (1966) asked groups of doctors to identify the types of medical advice patients found most difficult to follow. His results are consistent with the literature in this area and the results of the present study suggesting that regimens are more difficult for patients to follow when they require changes

in behavior or habits (i.e., dieting, work, etc.) are complex, painful, time consuming, or require patient judgement (Davis, 1966, p. 1044).

The only other marginally significant correlation involving RD was observed for pre-test Task Difficulty attributions ($r = -.34$). The researcher expected RD to correlate positively with both pre- and post-test Task Difficulty attribution patterns. It would seem logical that patients who had difficult regimens (and thus scored high on this variable) would also invoke Task Difficulty as a causal explanation for their diabetic control results. But apparently this was not the case for the subjects of this study.

The key to understanding this finding may be traced back to the structure of the Psychological Attribution questions. Recall that Task Difficulty was measured by the selection of this statement: "The (Diabetic Control) results are because of, how easy or difficult the task is." Thus patients who selected this statement as being more true than its counterpart could have done so because they perceived the task as either easy or difficult. They also had to consider their Diabetic Control results as either successful or not successful. These confounding interpretations are illustrated in Figure 4-A.

The present analysis does not allow for clarification of the discrepancies. Future studies may remedy this

		Perceived Task Difficulty: Easy	Perceived Task Difficulty: Difficult
Perceived Diabetic Control Results	Successful	I was Successful because the task (regimen) was easy	
	Not Successful		I was not Successful because the task (regimen) was difficult

Figure 4-A.--Conceptual Framework for Explaining Subject's Task Difficulty Attributions.

problem by using a different method of measuring the Psychological Attribution variables. Then a satisfactory explanation of correlations between Task Difficulty and Regimen Difficulty would be possible.

Health Beliefs

Patient Health Belief (HB) results were obtained by scoring the HB Likert items on a scale from 1 to 5 points. Higher scores indicated that patients in this study expressed beliefs consistent with those of complaint patients in previous research. Eighteen items were selected from full HB questionnaire for use in the analysis because these items yielded the highest reliability (.87) for this variable. Theoretically HB scores can range from 18 to 90.

The mean for HB was 60.67 while the standard deviation was 10.99. Correlations were computed for HB and all

other variables. HB correlated positively with pre-test ability (r = .34) and negatively with both pre-test and post-test luck attributions (r = -.54 and r = -.37 respectively; see Table 4-C). These results for HB add to the many studies in existence on the relationship of patient beliefs and both preventative and illness behaviors (see Becker et al., 1977). The items used in this study were designed based on dimensions of the Health Belief Model (see Becker, Drachman & Kirscht, 1972, p. 845) to measure patients beliefs about: (1) their susceptibility to complications, (2) the severity of their diabetes, (3) the benefits of their regimen, and (4) the barriers to following their regimen. Also as part of the HB variable, items measuring specific knowledge of Diabetes were included.

Support for the four Health Belief Model dimensions mentioned above can be found in the literature. However most previous research focused on measuring selected Health Belief dimensions in depth. In this study all four Health Belief Model dimensions and the Diabetic knowledge dimension were combined to measure a more general HB variable.

The Design

The Full Study was designed to include 27 patients who were randomly assigned to treatments (three levels) and physicians (three physicians) giving a completely crossed and balanced research design. One additional patient

originally agreed to participate, but dropped out of the study after the first week. The variable "physician" was included in the design so that its effects (if any) could be controlled, and allowed the primary emphasis in the analysis to be focused on the variable "treatments." Of the possible 162 total reports, there were only six occasions where patients failed to report results. All variables were corrected for missing data.

The two variables, HB and RD, were included in the design because previous research had established them as strongly contributing to a patient's compliance. It was felt that through the measurement of these two variables and inclusion of them in the design their effects could be controlled.

Pre-test measures were made on all six dependent variables (i.e., PAE, PA-Effort, PA-Ability, PA-Task Difficulty, PA-Luck and DC). This allowed the researcher to establish a baseline for the treatment physicians, and control for any initial treatment differences on these variables.

The Analysis

After each variable was scored as described earlier in this chapter, the analysis was completed in two steps. First, Regimen Difficulty, Health Beliefs (covariables common to all dependent variables) and the corresponding pre-test variables were used as predictors for the post-test values

of each of the major dependent measures (PAE, PA-Effort, PA-Ability, PA-Task Difficulty, PA-Luck, and DC). A series of six separate regression analyses were performed in which the two common covariables and the corresponding pre-test values were regressed on the post-test values. The results of this analysis are presented in Table 4-D.

These regression analyses test the hypotheses that there is no linear relationship between the variables being considered. Based on this analysis, there is evidence of a linear relationship ($a = .05$, $df = 3.23$) for three of the dependent variables, DC ($r^2 = .60$, F-value = 11.72), PA-Effort ($r^2 = .39$, F-value = 4.88), and PA-Luck ($r^2 = .50$, F-value = 7.692).

As evidenced by the Beta weight found in these regression analyses, negligible contributions were made toward a relationship with the dependent variables by inclusion of the HB and RD variables in the analyses, while the major contributing variable toward a relationship was made by the corresponding pre-test variable. It was expected that the pre-test variable would have the largest beta weight, but the researcher also expected larger beta weight for HB and RD based on previous research conclusions for these two variables. Obviously these expectations were not substantiated by the data of this study.

The results of the regression analyses allowed standardized residuals to be computed on each of the

Table 4-D.--Regression Analysis for Standardized Residuals of the Six Dependent Variables.*

	PAE	PA-Effort	PA-Ability	PA-Task Diff.	PA-Luck	DC
B_1 (HB)	.007	.015	.003	-.011	.002	.074
B_2 (Regimen Diff.)	.272	-.007	.018	-.019	-.017	.141
B_3 (Related Pre-Test)	.400	.779	.280	.426	.683	.510
Sums of Sq. Regression	243.43	11.084	1.260	2.967	9.476	1135.94
Sums of Sq. Error	672.25	17.400	9.851	10.270	9.445	743.43
Sums of Sq. Total	915.69	28.484	11.111	13.237	18.922	1879.37
F-value	2.78	4.884	0.981	2.215	7.692	11.72
R^2	.27	.39	.11	.22	.50	.60

*Using 3, and 23 degrees of freedom for each regression.

dependent variables. The Standardized Residuals represented the variability of the post-test scores which could not be predicted from the three covariables (HB, RD and related pre-test). These Standardized Residuals formed the input to the second step in the analysis which tested for treatment effects.

In Step II, a multivariate analysis of variance of standardized residual post-test scores was carried out. The means and standard deviations are found in Table 4-E. For the two variables PAE and DC, negative values are desirable as they indicate that patients are making fewer errors in the Physical Attributions and that they are improving their Diabetic Control. The means for PAE indicate that patients in the control and feedback group made fewer errors, but the patients in the Attribution treatment group made more errors than were predicted. Means for DC suggest that patients in the Control and Atrribution groups demonstrated poorer control than predicted, but those in the Feedback group improved control of their Diabetic Condition. It is important to note in this discussion that the sign (positive or negative) of these results suggest the above conclusions. But the small values associated with these signs suggests that there are minor (if any) real differences between treatment groups.

Because the Attribution Treatment was designed to train patients to attribute to "effort," the researcher expected negative residual values for this group on

Table 4-E.--Full Study Cell Means (and Standard Deviations) For Standardized Residuals.*

	PAE	Effort	Ability	T-Diff.	Luck	DC
Control Group	-0.122 (1.178)	-0.042 (1.142)	0.032 (1.082)	-0.349 (0.877)	0.209 (1.133)	0.018 (1.028)
Feedback Group	-0.011 (0.853)	-0.341 (0.750)	0.032 (0.810)	0.452 (1.098)	0.044 (1.284)	-0.242 (0.749)
Attribution Group	0.133 (1.048	0.382 (1.043)	-0.065 (1.190)	-0.103 (0.946)	-0.253 (0.440)	0.228 (1.228)

*n = 9 for each cell.

PA-effort. Negative values for all PA variables indicate an increase in the patients' attributions toward that factor. Patients in the Attribution treatment group apparently did not invoke effort attributions as frequently as was predicted. However, the values associated with all three treatment groups and "effort" attribution suggests that again there were no real between group differences. This was confirmed in the Multivariate Analysis of Variance.

As stated earlier, the Multivariate Analysis of Variance (MANOVA) was computed using standardized residuals of all six dependent variables to test for treatment differences. This analysis yielded an overall F-value of 0.26 (df = 12, 38) which clearly indicated that there were no effects detected attributable to treatment. Further analysis using Univeriate Analysis of Variance for each individual dependent variable residual and MANOVA on post-test scores alone were computed. Results were similar, no effects due to treatments were detected.

Based on these analyses, there is no evidence which indicates that the patients receiving feedback, or feedback and attribution training differed from those patients who simply recorded and reported results throughout the study. This conclusion holds true for all six dependent variables DC, PAE, PA-Effort, PA-Ability, PA-Task Difficulty, and PA-Luck.

Summary

The analysis of data and final results of this study indicate that the initial hypotheses were not supported. Patients receiving Feedback or Attribution plus Feedback training did not differ from those in the Control Group in any significant manner on any of the dependent variables. This conclusion is obviously disappointing particularly because Attribution theory and principles appear applicable to the specific problem of Diabetic Patient Compliance, and to many general Medical-Behavioral problems being faced by the Health Care Industry.

However, results of this study do have important implications for measuring certain variables (i.e., Diabetic Control, Regimen Difficulty and Physical Attribution Errors). Also numerous explanations and important items of discussion regarding the treatments utilized became apparent as a result of this study. These will be examined and discussed at length in the next chapter.

CHAPTER V

DISCUSSION AND CONCLUSIONS

In this chapter, the results of this study will be discussed along with the conclusions. The major focus of the chapter will center around Attribution Theory and principles as applied to the problem of Diabetic Compliance or Self-Control. This discussion will begin with the results described in Chapter IV. Numerous alternative explanations for the results on Diabetic Control, Psychological Attributions, and Physical Attribution Errors will be presented in relation to the three treatments utilized. Suggestions for further research will also receive attention.

Attribution Theory proposes that as individuals succeed or fail at achievement tasks, they cognitively attribute causes for these outcomes. These attributions motivate and direct subsequent achievement behavior. This study was designed to expand on previously studied Attribution principles and to apply these to the achievement task of Diabetic Self-Control. In this context success or failure at Diabetic Control was measured by patient self-reports. Patient's Psychological Attributions for the

achievement task outcomes were measured, as were patient's Physical Attribution Errors. Three treatment interventions were used in an experimental design. One group of patients simply reported Diabetic Control Results. A second group reported results and received feedback on Diabetic Control success from a physician. A third group reported results, received physician feedback and received attribution training. This Attribution Training consisted of physician statements to encourage "effort" attributions and to identify the most correct physical causes for Diabetic Control success or failure.

As reported in Chapter IV, the results and analysis of data indicate that there were no differences between the treatment groups on any of the dependent variables. These results suggest that the achievement task of Diabetic Control is certainly a complex one, and that the Attribution Treatment was ineffective in improving Diabetic Self-Control in relation to the two Control Group Treatments. Numerous explanations are available to clarify these results.

Effectiveness of Attribution Treatment

Various proponents of Attribution Theory (Weiner, 1972; Bar-Tal, 1978) suggest that treatments which are effective in changing an individual's Psychological Attributions will also impact on subsequent behavior. Such attribution changes may improve individual's self-responsibility and motivate the individual to improve performance.

In the case of Diabetic Patients, this rationale was applied and formed the basis for the research under consideration here. Specifically, Diabetic patients who are having difficulty in controlling their disease may be making the following Attributional statements: "I am unable to control my diabetes because the task (Diet, Medication, etc.) is too complex or difficult for me," or, "I am not successful at controlling my condition because I always have bad luck." For the Diabetic who is not successful at Diabetic Control, these two attributions theoretically relieve them of the responsibility to improve. When these patients occasionally succeed they may invoke similar responsibility denying attributions, i.e., "My success was an accident (luck)", and therefore they may not be motivated to develop or maintain behaviors leading to successful performance.

If an Attribution Treatment is successful in changing these self-defeating attributions, patients should invoke more effort attributions (i.e., "I failed because I did not try hard," or "I succeeded because I tried real hard") and therefore may be motivated to improve control over their conditions. The major problem is to develop an attribution intervention which does affect the patient's attributions to ability, effort, task difficulty, and luck. Based on the evidence of this study, there is no evidence to show that attributions of patients differed as a result of the treatment intervention.

The most obvious conclusion based on these results is that the Attribution training utilized here was not sophisticated enough to impact on the patient's patterns of Attribution. If this is true, a stronger or longer treatment may demonstrate different results. However, there are other explanations for the results observed in this study.

First, the treatment physicians noted late in the treatment phase of the study, that in very informal ways they were always trying to encourage patients to "try harder" and to understand the causal relationships between the physical factors and Diabetic Control. They suggested that the Feedback treatment and the Attribution treatment did not differ significantly.

The question which may be asked is, did the patients perceive their participation in each of the three treatments as an equally powerful educational experience? Patients in each group regularly monitored, recorded and reported their Diabetic Control results. Perhaps this alone was a sufficiently powerful exercise to cause consistent changes in Diabetic Control for all patients regardless of other training activities. It is also possible that monitoring and reporting Diabetic Control results was sufficient to initiate all patient's attribution processes, and the additional training for the Feedback and Attribution groups was thus redundant.

It may be argued that there were competing elements within the Feedback and Attribution treatments which tended

to cancel out any additional gains made. This is a particularly important point in considering the complexity of the Attribution Treatment. This treatment was designed to help patients develop self-control and accurately establish causal relationships for their Diabetic Control results. However, the patients may have gained from the physician statements which encouraged them to "put forth more effort" and lost these gains from the physicians' instruction on the physical causes of their Diabetic Control Results. These issues should be considered in the design and implementation of future research.

A second explanation for the results observed here is that the patients were volunteers who may have had their Diabetes relatively well controlled. The procedures used to select patients for the Pilot Study differed somewhat from those used to select patients for the Full Study, lending some credence to this argument. Pilot Study patients were identified by the nurses as Diabetics who frequently visited the office "with problems." While patients used in the Full Study were selected from all diabetics from this practice, who were not contacted to participate in the Pilot Study. Based on these selection procedures it is possible that only relatively well controlled Diabetics may have been chosen to participate in the Full Study.

Another concern related to the sample selection must be considered. The population of this study from which the sample was selected consisted of patients who had been

diagnosed as Diabetics for a long period of time. They were already involved in managing their condition and probably received prior instruction to varying degrees from physicians, nurses and other health care providers. If this previous training and experience was effective, the patients may have reached their maximum potential for control over their Diabetes. Thus, it may have taken an extraordinary educational intervention and supreme "effort" for the patients to make relatively minor changes.

In contrast, newly diagnosed Diabetic Patients would have more to gain (they are starting with their condition in relatively less control). They may be able to benefit from any of the treatments to a greater degree before they reach the maximum potential for Diabetic Control. Future research in this area should carefully consider the costs and benefits of using a population of newly diagnosed versus experienced diabetic patients.

A third possible explanation for the results observed here is that the measurements of Psychological Attributions, Physical Attribution Errors, and Diabetic Control were unreliable or not sensitive enough to "real changes." Elig and Frieze (1975) have described many of the problems found in measuring Psychological Attributions. They suggest that the multiple bipolar scales such as the ones used in this study are among the better methods of measurement available in the study of Psychological Attributions (p. 623).

Finally, the results suggesting no differences due to treatment groups, may be explained in terms of the design or analysis. In this study a relatively small sample was issued (N = 27). This may have contributed to the finding of no differences. Patients were randomly assigned to physicians and treatments. But, it is possible that the results were biased because of the small sample size (resulting in insufficient power) and the fact that patients in any of the treatment groups may have inadvertently been assigned to their own personal physician for the purposes of this study. Some previous studies (Bloom, 1977) suggest that a long standing relationship with a physician may influence the patient's motivation and compliance.

Diabetic Control

Even though the results on Diabetic Control relied heavily on self-reports and revealed no differences between treatment groups, the researcher has some confidence that the measure of this variable is reliable. In this study patients were thoroughly trained to test, record and report urine glucose and ketone results by nurses who conducted the initial home interviews. Unlike previous studies, patients in this study were contacted by phone and asked to report their DC results (including both urine test results and selected behavioral measures of Diabetic Control) for the previous 24 hours only. Physicians reviewed these results, noting any inconsistencies or irregularities and

helped patients to understand the importance of "reporting results accurately." As the study progressed the physicians became increasingly comfortable that these results were reliable.

Based upon these observations, the measures of Diabetic Control used here seem to be an improvement over those used previously. Further research in this area may be needed to verify these impressions, as the methodology for laboratory measures of long term Diabetic Control improves. One such laboratory measure, the Glycocilated Hemoglobin, was recently introduced to measure a patient's average degree of control over a 60 to 90 day interval. Research which correlates the results from Diabetic Control Measures used in this study with results from the Glycocilated Hemoglobin test may provide a means of evaluating these measures.

Aside from these methodologic questions, the hypothesized changes in Diabetic Control due to Attribution training never materialized. Based on the principles of Attribution, such changes should only have occurred if the Attribution training used was successful in changing patient's patterns of Psychological and Physical Attributions. But because the Attribution intervention was not successful in demonstrating changes in patient's patterns of Attribution, no differences in Diabetic Control could be expected. Thus this study provides no clear data to show that Attribution principles will be effective in improving patient's self control.

Physical Attribution Errors

In many ways the most interesting conclusions coming from this study involved Physical Attribution Errors. This variable involved an initial attempt to study one area of Attribution which has been problematic to researchers. The major problem in studying Attribution Errors has been described in terms of the difficulties researchers face in defining errors unambiguously (Fischoff, 1976). This problem reoccurred in this Pilot Study, but was successfully resolved in the Full Study by training physicians to use a flow-chart for determining the correct physical causes for success or failure at Diabetic Control. Thus Physical Attribution Errors were defined unambiguously as the amount of disagreement between physician's and patient's assessments of the physical causes of Diabetic Control. However, future studies need to be conducted to establish the reliability and validity of this measure. If such studies establish this measure as reliable and valid, other studies could follow to further explore the Atrribution Error process.

Another interesting aspect of the PAE variable has particular relevance to medical practitioners. For example, if patients appear to be exhibiting specific patterns of Errors, perhaps the physician can determine an intervention to correct this problem. And if Attribution Theory is applicable to the medical field, such training should have a positive impact on subsequent patient self-control behavior. The physicians who participated in this study clearly

recognized these implications and have pursued the researcher for more detailed data to define the most frequently occurring error patterns.

The implication for Diabetic patients or others having chronic diseases are equally important. Such patients may be making errors because of faulty inductive reasoning regarding their own condition. And if a reliable intervention can be proven to correct this problem, such patients would improve their prognosis and possibly be able to live a more rich and full life.

Although the results of this study are inconclusive in regards to the Attributional Error process, the findings do suggest that some errors can be measured. This study opens the door to study the error process and suggests that important implications are possible. Researchers and proponents of the Attribution position should explore these possibilities in relation to all of the achievement tasks which they are now studying.

Regimen Difficulty and Health Beliefs

Regimen Difficulty and Health Beliefs were measured for each patient and included in this study as covariables because previous studies suggest that these two variables are correlated with Patient Compliance. In this study Regimen Difficulty was measured by having two physicians review and evaluate each patient's regimen. High reliability between these two independent ratings was demonstrated.

Correlations observed between Regimen Difficulty and Diabetic Control on both the pre-test and post-test indicate that patients having difficult regimens also tend to have more trouble controlling their Diabetes. This finding is consistent with results of previous studies and the intuitive feelings of most practicing physicians.

Patients' Health Beliefs were measured by patients responses to a Health Belief Questionnaire. This questionnaire was developed using Becker's Health Belief Model as a guide for the construction of items (Becker, Drachman & Kirscht, 1974). However, the results of this study do not support the position that patients' Health Beliefs correlate highly with Diabetic Self Control. Also the low Beta weight noted for the Health Belief variable made a negligible contribution to predicting post-test results.

The marginally acceptable reliability of the Health Belief questionnaire indicates that the measurement of this variable needs refinement and standardization. Some previous studies of this variable have focused on patients' general beliefs about health defining it as a relatively stable personality trait while others have focused on more transient Health Beliefs, i.e., What patients believe about the treatment prescribed today. Further studies which demonstrate effective methods for measuring Health Beliefs as stable traits and as relatively changeable states may assist in developing this variable as a more viable correlate of compliance.

Summary

This study attempted to extend principles established in Attribution research to the problem of Diabetic Self-Control, and to measure and explore the Misattribution process. The data, however, demonstrated that patients receiving Attribution training did not differ from the two Control Group Patients on any of the major dependent variables. No Treatment differences were found in patterns of Psychological Attributions, Physical Attribution Errors, or Diabetic Control, even when data was corrected for Regimen Difficulty and Patient Health Beliefs.

It has been suggested that a more sophisticated Attribution intervention may result in changes in Attributions and subsequent behavior. But studies which follow up on this research should carefully consider methods of measurement of all variables and utilize a patient population which is clearly experiencing problems in controlling their Diabetic condition. Physical Attribution Errors were measured and examined in a rather unique way in this study. Although there were no differences found between groups on this measure, a number of interesting dimensions of the Attribution Error process were identified. Future research should be conducted using the methods described in this study as a blueprint to examine the implications of this error process.

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APPENDICES

APPENDIX A

PILOT STUDY

PERSONNEL TRAINING PROCEDURES

APPENDIX A

PILOT STUDY

PERSONNEL TRAINING PROCEDURES

Nurse Training Procedures

Initial Phone Contact

1. Introduce yourself as representing EWSH Family Practice.
2. State the purpose of the phone call.
   i.e., TO INVITE PATIENTS TO PARTICIPATE IN A PATIENT EDUCATION STUDY TO HELP THEM BETTER CONTROL THEIR DIABETES.
3. Ask patient if you can visit with them at their home to discuss the study with them (or if they will come into the office).
4. Set a date and time (within the next five days).
5. Answer any questions.
6. Thank the patient for their co-operation.

CHECKLIST FOR NURSES: What to bring to patient interview

1. Patient folder including

   a. Daily record (to be left with patient)
   b. Patient Health Belief Questionnaire
   c. Patient Consent Form

2. 150 Ketodiastix (three boxes, to be left with the patient)

3. Weight Scale

4. Nurse/Patient Interview (outline)

5. Patient Initial Interview (form). During the patient interview be sure to cover all items on this form, so that you can fill it out completely.

CHECKLIST FOR NURSES: What to return after the patient interview

1. Patient Consent form, signed by both the patient and nurse if the patient has agreed to participate.

2. Patient Health Belief Questionnaire, filled out by patient (be sure that the patient's name appears on the questionnaire).

3. Patient Initial Interview form, filled out by the nurse.

4. Correct patient name, address, and phone number.

5. Weight scale, return to office for next patient/nurse interview.

   Note: Ask patient to begin using the Ketodiastix immediately (twice per day) and begin filling out daily record.

NURSE/PATIENT INTERVIEW

1. Introduce yourself as representing EWSH Family Practice.
2. Small talk (get comfortable).
3. Purpose of this visit is: TO INVITE YOU (the patient) TO PARTICIPATE IN A PATIENT EDUCATION STUDY WHICH MAY HELP YOU BETTER CONTROL YOUR DIABETES.
4. If you agree to participate, this is what we will ask of you:
   a. Test your urine daily for glucose and Ketones.
   b. Record your urine test results and respond to a short list of questions each day.
   c. Report your test results and responses to questions over the phone.
   d. Occasionally speak with a doctor on the phone.
   e. Respond to one questionnaire.
   f. One return visit to the doctor's office, at the doctor's request.
5. If you agree to participate, we will:
   a. Provide you with all urine testing materials.
   b. Provide you with an opportunity to talk with a doctor about your Diabetes on the phone.
   c. Guarantee that information will remain confidential.
   d. We also believe that your participation in this study: may help you obtain better control over your diabetes.
6. Respond to questions.

7. Present the consent form to the patient--READ IT ALOUD.
8. Respond to any questions and ask the patient to sign the consent form.
9. Provide the questionnaire to the patient and allow enough time for the patient to complete it.
10. Provide the packet of materials.
11. Review procedures for:
    a. Urine testing and recording results.
    b. Responding to daily questionnaires.
    c. Reporting to the office.
12. Set up a time when the office can call this patient to obtain the results from their urine testing and question responses.
13. Remind patients that IT IS MORE IMPORTANT TO REPORT INFORMATION ACCURATELY THAN IT IS TO SHOW GOOD RESULTS.
14. Weigh the patient.
15. Thank the patient--EXIT!
16. Fill out Nurse Form.

OFFICE STAFF TRAINING PROCEDURES

1. Ask physician if s/he is ready to receive a call.

2. Phone patient. Introduce yourself and state that you are calling from E. W. Sparrow Family Practice Center.

3. Ask the patient if they have completed their urine testing for today and if they have filled out today's questionnaire.

   a. If answer is NO, then say: "It is important that you complete as much as possible. I will call you back in 10 minutes. Can you complete your urine testing and fill out the questionnaire by that time?" Close phone call.

   b. If answer is YES, then say, "Great, we do appreciate your effort." (Continue on to #4.)

4. Ask patient to read their responses to the questionnaire. RECORD THEIR ANSWERS IN THIS NOTEBOOK.

5. Tell patient to hold the phone while you arrange for the doctor to speak to them.

6. Fold and staple the lower half of the questionnaire leaving only questions 1 through 8 visible. Then pass the folder on this patient to the doctor.

7. Wait for the doctor before making the next phone call.

PILOT STUDY

PRE-POST TEST PHYSICIAN TRAINING

PURPOSES:

1. To assess the patient's diabetic control to be successful or not successful.

2. To assess the causes of the patient's diabetic control results.

PROCEDURES:

I. Assessing Diabetic Results

A. Review the information given you by office staff on Diabetic Control results.

B. Do these results show that the patient has controlled their diabetes?

C. Success defined as:

1. Diabetic control results showing uring tests of negative or trace, and no reactions, or

2. Improvement: For a patient who consistently has shown a pattern of poor diabetic control, you may judge success by improvement (i.e., instead of urine glucose tests of +3 or +4, the patient shows urine glucose tests of trace or +1). Or for the patient who consistently reports insulin reactions of three or more, you may judge success as a reduction of reactions to one or less.

D. Not Success defined as:

1. A pattern of high glucose (+3 or +4) or Ketone (+2 or +3) results, or frequent reactions.

2. Worsening of Diabetic Control results.

E. Talk with the patient to collect any additional data needed to decide Success or Not Success.

II. Assessing the Cause of Diabetic Control Results

A. Upon receiving the results from the office staff and deciding about the degree of success of the patient in controlling their Diabetes, discuss the

information with the patient sufficiently so that you can judge which factors caused these results.

B. Close the phone conversation with the patient and fill out the short questionnaire "Physician Assessment of Causes of Diabetic Results."

PILOT STUDY

ATTRIBUTION TREATMENT PHYSICIAN TRAINING

PURPOSES:

1. To train patients to recognize their own diabetic control results as being successful or not successful.

2. To train patients to attribute those results to internal psychological factors in hopes that they will take more responsibility for themselves and exhibit more self-control over their diabetic results.

PROCEDURES:

I. Assess Diabetic Control Results as Successful or Not Successful. Follow the guidelines described under Pre-Post test physician training.

II. Assess the physical causes of the diabetic control results as described under Pre-Post test physician training.

III. Begin patient Attribution Instruction

A. Success

1. If you determine that the results indicate success you want the patient to know this so state it, i.e., "Your urine test results and report of your reactions indicates that you are managing your diabetic results well. You needed to get _____ (urine test results) and you got _____ (urine test results) with only _____ reaction."

2. You (physician) also want to train patients to take responsibility for these successes and feel good about them. In order to guide the patients toward this goal, make a statement to the patient that their results indicate that they have fulfilled their responsibility, i.e., "These successful results indicate that you either have tried very hard or you are developing the ability to control your diabetes. (Emphasize trying hard.)

B. Not Successful

1. If you (physician) have determined the results do not indicate success, you want the patient to know this. Make a statement to that effect. i.e., "Your (patient) urine test results (or report of reactions) indicate that you are not managing your diabetes well. You needed to get _____ (results) but you actually got _____ (results).

2. As the physician you also want to train the patient to accept responsibility for poor results and be motivated to do something about it. In order to guide the patient toward this goal you, together with the patient, must assess the difficulty of the regimen. You may wish to ask the following questions:
"In order to help you control your diabetes better let's discuss the difficulty of your treatment plans. If you were to try really hard to stay on the diet you have do you think you could follow it? How about your medication, if you were to try very hard to take your medication when you are supposed to and to take the right amounts of medication do you think you could do this? What about exercises do you know that it is important to try very hard to get the same amount of exercise at the same time of the day? Could you try harder to do this?
After this discussion you may find that the patient may need modifications in the regimen. Do so. Remember the intent of this discussion is to eliminate any causes outside the patient's control, i.e., patient can't any longer say, "I'm not getting good results because it is too difficult for me."

3. When you and the patient agree that the task is not too difficult restate, "The results which you got today indicates that you are not controlling your diabetes well. Remember you want to get _____ (results). In order to do this you must try harder to follow the treatment plans.

APPENDIX B

PILOT STUDY INSTRUMENTS

APPENDIX B

PILOT STUDY INSTRUMENTS

PILOT STUDY

NURSE PATIENT INITIAL INTERVIEW QUESTIONNAIRE

PATIENT'S NAME_____ NURSE'S NAME_____

DIRECTION: After you have left a patient's home, please fill out this questionnaire. Be as specific as possible in your responses. It is important to include your impressions and feelings about the patient. When you do state impressions, or feelings please identify them, i.e., "My impression was . . ."

1. Do you think this patient can regulate the routine aspects of their diabetes? _____ Why? _____
   _____
   _____

2. Does the patient's financial position allow them to purchase the necessary supplies to maintain a regimen? _____
   _____
   _____

3. Does the patient live in a family/social environment supporting compliance with a diabetic regimen? _____ Why? _____
   _____
   _____
   _____

4. Is there any reason why this patient could not follow a diabetic regimen? _____ Physically? _____ Emotionally? _____
   Socially? _____ Intellectually? _____ Why? _____
   _____
   _____
   _____

5. Other important observations or comments noted in the interview and relevant to the patient's diabetic condition should be described here. _____
   _____
   _____
   _____

PATIENT NAME _____

PILOT STUDY
HEALTH BELIEF QUESTIONNAIRE

DIRECTIONS: Everyone has certain beliefs about diabetes and what helps them to feel better. Below are a list of statements that some people believe about the seriousness of diabetes and the benefits of treatment. Since this is a survey of feelings or beliefs please indicate your agreement with these statements regardless of what you think other people want you to say.

There are no right or wrong answers!

All items are to be rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

1. I would have to change too many habits to follow my diabetic treatment plans.

   SA A U D SD

2. When diabetes is not controlled it will lead to more serious medical problems.

   SA A U D SD

3. I believe that diabetes rarely contributes to more serious medical problems.

   SA A U D SD

4. I have enough money to buy the things I need in order to follow my treatment plans.

   SA A U D SD

5. My diabetes could cause me more medical problems.

   SA A U D SD

6. My diabetes would be worse if I did not follow my treatment plans.

   SA A U D SD

7. I believe that if I follow my treatment plan, I can control my diabetes.

   SA A U D SD

All items are rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

8. My diabetes treatment is a lot of nonsense.

SA A U D SD

9. I worry so much about my job that I often cannot follow my diabetes treatment plan.

SA A U D SD

10. I believe that diabetes will cause other worse medical problems.

SA A U D SD

11. I believe I can control my diabetes if I follow my doctor's advice.

SA A U D SD

12. My personal life does not interfer with me following my diabetic treatment plans.

SA A U D SD

13. A person could do everything he is supposed to do to control his diabetes but it probably will not help much.

SA A U D SD

14. I believe that diabetes cannot cause me more medical problems.

SA A U D SD

15. I worry so much about my family that I often forget to follow my treatment plans.

SA A U D SD

16. I have others around me at home who help me follow my diabetic treatment plans.

SA A U D SD

17. I do not have enough money to buy the foods I need to follow my diabetic treatment plans.

SA A U D SD

Items 18, 19, and 20 are rated using the following key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

18. Other people expect me to do things different than my diabetes treatment plans require.

SA A U D SD

19. It takes too much time from my personal life to follow my diabetic treatment plans.

SA A U D SD

20. My job and the people I work with do not interfere with me following my treatment plans.

SA A U D SD

DIRECTIONS: For questions 21 through 25, find the answer which you most believe and circle it.

---

21. When you compare diabetes with a Heart Attack, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

22. When you compare diabetes with a Cold, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

23. When you compare diabetes with Tooth Cavities, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

24. When you compare diabetes with Cancer, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

25. When you compare diabetes with the Flu, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

DIRECTIONS: People with diabetes usually know more about this disease than other people who do not have diabetes. Below are a list of statements related to diabetes. Please indicate whether you believe each statement is TRUE or FALSE. Respond to every statement.

26. A consistent amount of exercise is important to the control of diabetes.

TRUE FALSE

27. When a diabetic develops an illness such as the flu, they should usually call their doctor.

TRUE FALSE

28. It is important for diabetics to take medications sometimes during the day (timing is not important).

TRUE FALSE

29. In order to control diabetes it is very important to follow your diet carefully.

TRUE FALSE

30. It is important for diabetics to take medications according to a regularly scheduled daily pattern.

TRUE FALSE

31. In order to control diabetes it is very important to eat extra food when you feel tense.

TRUE FALSE

32. When illness such as the flu develops, the diabetic should increase the amount of food in his diet.

TRUE FALSE

33. Sometimes stress has important effects on the control of diabetes.

TRUE FALSE

34. When having a hyperglycemic reaction you may feel loss of hearing, and chest pains.

TRUE FALSE

35. When having a hypoglycemic reaction (insulin reaction) you may feel loss of appetite, increase in thrist, and notice large amounts of sugar and ketones in your urine.

TRUE FALSE

36. It is important for diabetics to take their medications only when they feel poorly.

TRUE FALSE

37. When illness such as the flu develops, the diabetic should always increase their medication.

TRUE FALSE

38. In case of a hypoglycemic (insulin) reaction, you should take fluids without any sugar and call the doctor.

TRUE FALSE

39. In case of a hyperglycemic reaction you should stop taking medications immediately.

TRUE FALSE

40. In order to control diabetes it is important to stop any exercise you may be doing.

TRUE FALSE

41. In case of a hypoglycemic (insulin) reaction you should take more diabetic medications.

TRUE FALSE

42. In case of a hypoglycemic (insulin) reaction you should take sugar or a food containing sugar quickly.

TRUE FALSE

43. When having a hypoglycemic (insulin) reaction you may feel hunger, trembling, impared vision, and faintness.

TRUE FALSE

44. In case of a hyperglycemic reaction you should take sugar or a food containing sugar quickly

TRUE FALSE

45. Diabetes can be defined as a condition occurring when the body does not produce enough insulin.

TRUE FALSE

46. Stress has no effect on the control of diabetes.

TRUE FALSE

47. When having a hyperglycemic reaction you may feel hunger, trembling, impaired vision and faintness.

TRUE FALSE

48. Stress is more important than any other factors in the control of diabetes.

TRUE FALSE

49. In order to control diabetes, it is important to change your exercise habits every day.

TRUE FALSE

50. In case of hyperglycemia you should take fluids without sugar and call the doctor.

TRUE FALSE

51. When having a hypoglycemic (insulin) reaction you may feel chest pains, and loss of hearing.

TRUE FALSE

52. Diabetes can be defined as a condition occurring when the stomach does not digest the food you eat.

TRUE FALSE

53. In order to control diabetes it is very important to eat less food when you loose your appetite.

TRUE FALSE

54. When experiencing hyperglycemia you may feel loss of appetite, increased thirst, and notice large amounts of sugar and ketones in the urine.

TRUE FALSE

55. Diabetes can be defined as a condition occurring when the body produces too many hormones to operate properly.

TRUE FALSE

PILOT STUDY

CONSENT FORM FOR DIABETIC PATIENT EDUCATION STUDY

1. I have freely consented to take part in a study being conducted by Michael Radke under the supervision of Dr. Crow at E. W. Sparrow's Family Practice Clinic, and Dr. Byers from Michigan State University.

2. The study has been explained to me and I understand the explanation that has been given and that my participation will involve:

   a. testing my urine for sugar and ketones,
   b. filling out a short questionnaire each day,
   c. reporting my answers to the questionnaire three times each week for five weeks,
   d. talking to a doctor on the phone periodically,
   e. responding to one questionnaire, and
   f. one return visit to the doctor's office, at the doctor's request.

3. I understand that I am free to discontinue my participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous.

5. I understand that my participation in the study may provide, but does not guarantee, any beneficial results to me.

6. I understand that, at my request, I can receive additional information about the study after my participation is completed.

Signed _____

Date _____

Witness _____

Name: _____ Date _____

PILOT STUDY OFFICE DAILY RECORD

DIRECTION: Answer each of the following questions by marking the most correct response.

---

1. What time did you conduct your first urine test? _____

2. What was your glucose test result? ___ negative ___ trace ___ + ___ ++ ___ +++ ___ ++++

3. What was your ketone test result? ___ negative ___ trace ___ + ___ ++ ___ +++ ___ ++++

4. How many reactions did you have since you last recorded your results?

   ___ None (0) ___ One (1) ___ Two (2) ___ Three or more (3+)

---

5. What time did you conduct your second urine test? _____

6. What was your glucose test result ___ negative ___ trace ___ + ___ ++ ___ +++ ___ ++++

7. What was your ketone test result? ___ negative ___ trace ___ + ___ ++ ___ +++ ___ ++++

8. How many reactions did you have since your last recorded your results?

   ___ None (0) ___ One (1) ___ Two (2) ___ Three or more (3+)

Indicate how important each factor is in causing the results obtained today:

9. Diet: Not important 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Very important

10. Medication: Not important 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Very important

11. Exercise: Not important 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Very important

12. General Health: Not important 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Very important

13. Stress: Not important 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Very important

---

For the following items indicate which answer most affected your results today:

14. The results are mostly because of: _____ How hard I tried
    _____ How easy or difficult the task is

15. The results are mostly because of: _____ How my luck went today
    _____ How well I am able to perform the task

16. The results are mostly because of: _____ How my luck went today
    _____ How easy or difficult the task is

17. The results are mostly because of: _____ How hard I tried
    _____ How my luck went today

18. The results are mostly because of: _____ How easy or difficult the task is
    _____ How well I am able to perform the task

19. The results are mostly because of: _____ How hard I tried
    _____ How well I am able to perform the task

Page 2 of Pilot Study Office Daily Record

PHYSICIAN ASSESSMENT OF DIABETIC RESULTS

PHYSICIAN: _____

DIRECTINS: Indicate how important each factor is in causing the results report

Diet:	Not important	1	2	3	4	5	Very important
Medication:	Not important	1	2	3	4	5	Very important
Exercise:	Not important	1	2	3	4	5	Very important
General Health:	Not important	1	2	3	4	5	Very important
Stress:	Not important	1	2	3	4	5	Very important

The results which the patient reported today indicate:

___(a) Successful Control of Diabetes. ___(b) Not Successful Control of Diabetes.

PATIENT NAME_____

PILOT STUDY

REGIMEN DIFFICULTY QUESTIONNAIRE

PHYSICIAN: _____

DIRECTIONS: Indicate how difficult each of the following factors make the diabetic regimen prescribed for this particular patient.

1. The Diet portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

2. The Medication portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

3. The Exercise portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

4. The General Health portion of the regimen makes this patient's regiment:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

5. The Stress portion of the regimen makes this patient's regiment:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

APPENDIX C

TRAINING PROCEDURES FOR THE FULL STUDY

APPENDIX C

TRAINING PROCEDURES FOR THE FULL STUDY

PRE-POST TEST PHYSICIAN TRAINING

PURPOSE:

1. To review data from patient to determine Success/Non-Success of Diabetic Control.

2. To review data from patient to determine the physical causes of Diabetic Control results.

PROCEDURES:

1. Review information given you by the office staff on Diabetic Control results.

2. Collect any supplemental data needed from the patient during the phone contact to decide on Success/Non-Success of Diabetic Control.

3. Decide on Success/Non-Success using the following criteria:

   SUCCESS defined as:

   a. Diabetic Control results showing urine tests of negative or trace, no reactions, and low frequency reports of consumption of foods containing sugar.

   b. Improvement: For a patient who has consistently shown a pattern of poor Diabetic Control (urine test results consistent +3 or +4, frequent reactions, or frequent reported consumption for forbidden foods) you may judge success by improvement. For example, instead of urine test results of +4, the patient shows results of trace or +1; OR for patient showing frequent reactions, success may be less frequent reactions; OR for the patient showing frequent consumption of forbidden foods, success may be less frequent consumption of these foods.

NON-SUCCESS defined as:

a. A pattern of high urine test results (glucose +3 or +4, ketone +2 or +3), or frequent reactions, or high frequency of consumption of forbidden foods.

b. Worsening of Diabetic Control results.

4. Decide the priority of the physical causes of the Diabetic Control results.

   a. When you have determined results show Success; use flow chart for successful results.

   b. When you have determined results show Non-Success; use flowchart for non-success.

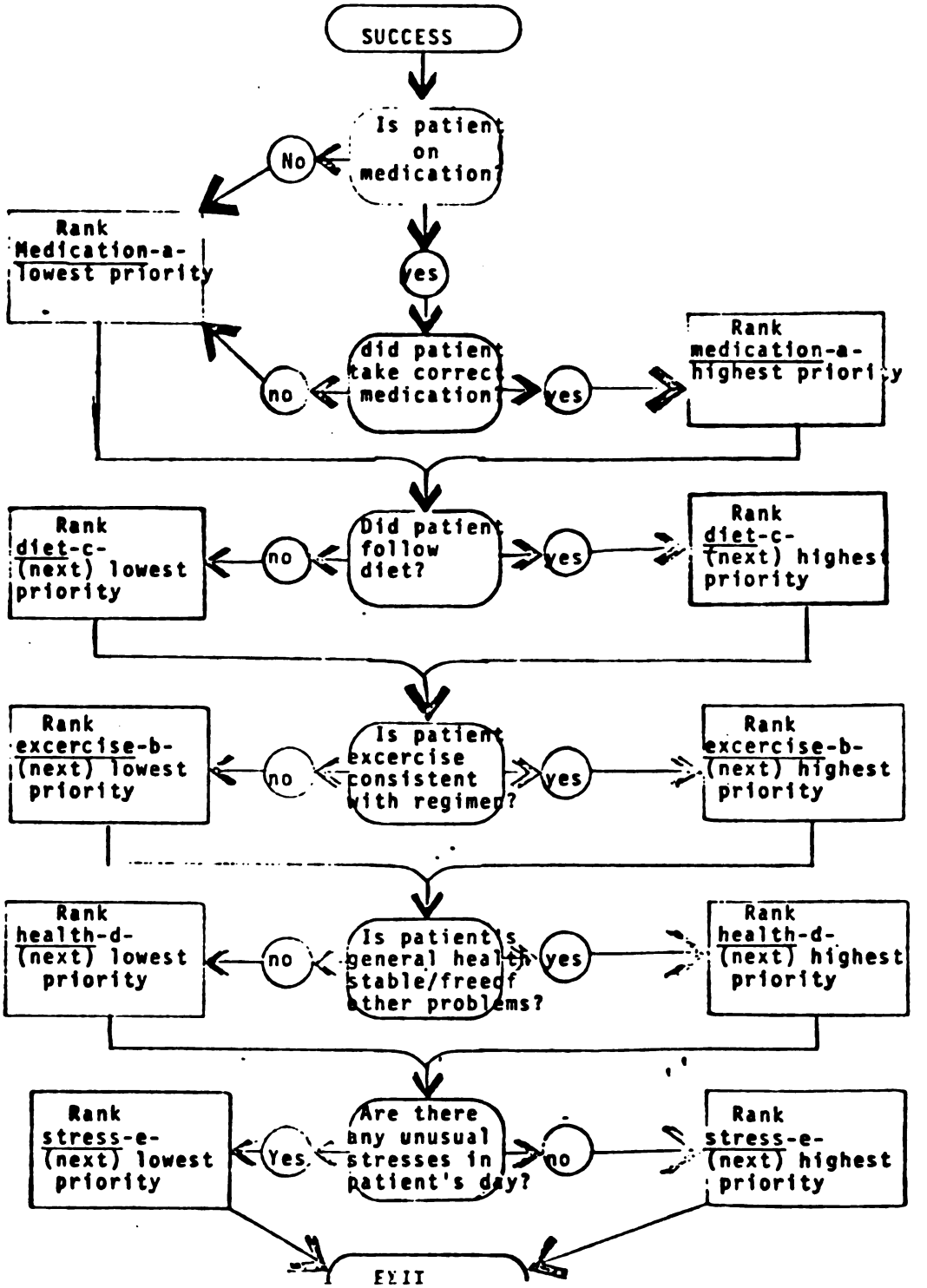
5. Fill out Physician Daily Report form indicating:

   a. Success or Non-Success at Diabetic Control

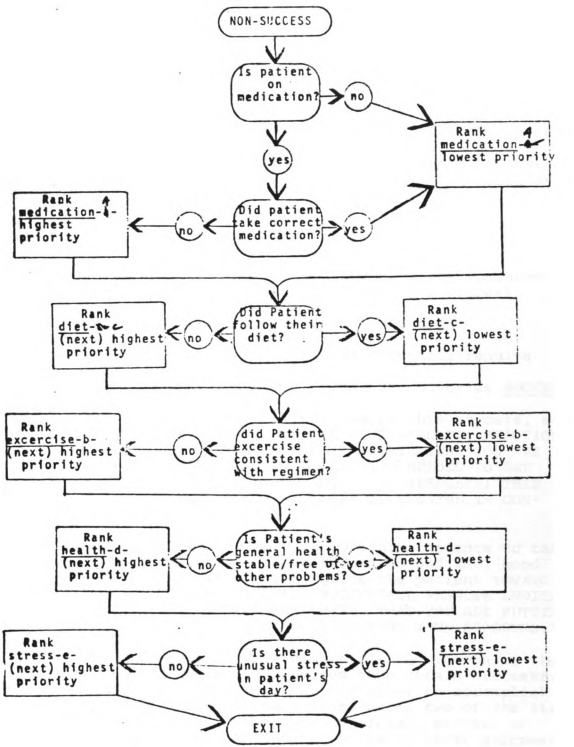
   b. Physical causes for Success/Non-Success

6. Do not report any information to the patient at this time.

ASSESSING PHYSICAL CAUSES FOR SUCCESSFUL DIABETIC CONTROL



ASSESSING PHYSICAL CAUSES FOR NON-SUCCESSFUL DIABETIC CONTROL



THE FULL STUDY

TREATMENT PHYSICIAN TRAINING

ATTRIBUTION TREATMENT

PURPOSE:

1. To train patients to recognize the physical causes of their own Diabetic Control results, and the success indicated by these results.

2. To train patients to attribute their results to internal psychological factors (EFFORT or ABILITY) in hopes that they will take more responsibility for themselves and exhibit more self-control over the routine aspects of their diabetes.

PROCEDURES:

1. Complete the "Data Collection" sequence to determine (see Pre-post test physician training procedures):

   a. Success/Non-Success in Diabetic Control

   b. The physical causes of Diabetic Control results

2. When patient Diabetic Control results indicates SUCCESS:

   a. You want the patient to recognize this success, so state it, i.e., "YOUR URINE TEST RESULTS, REACTION REPORTS, AND EATING HABITS INDICATE THAT YOU ARE MANAGING YOUR DIABETES WELL. YOU NEEDED TO GET _____ (RESULTS) AND YOU GOT _____ (RESULTS) THIS INDICATES THAT TODAY YOU WERE SUCCESSFUL IN CONTROLLING YOUR DIABETES.

   b. You (physician) also want to train patients to take responsibility for these successes and feel good about them. In order to guide the patient toward this goal, state: "THESE SUCCESSFUL RESULTS INDICATE THAT YOU HAVE TRIED REAL HARD, THAT YOU ARE PUTTING FORTH THE EFFORT NEEDED TO CONTROL YOUR DIABETES."

   c. You also want the patient to clearly recognize the physical causes which helped them obtain successful diabetic control results. In order to accomplish this, identify to the patient which two of the five factors (diet, medication, exercise, stress, or general health) most contributed to their successful results today. For example, for the patient who carefully followed his diet and exercised, you might

say: "You probably were successful in controlling your diabetes today because you carefully followed your diet and exercised appropriately.

3. If the patient's results indicate that they have not succeeded in controlling their diabetes:

   a. You want the patient to know this, so guide the patient by stating: "YOUR TEST RESULTS, REPORT OF REACTIONS OR EATING HABITS INDICATE THAT YOU ARE NOT MANAGING YOUR DIABETES WELL. YOU NEEDED TO GET _____ RESULTS, BUT YOU GOT _____ RESULTS. THESE RESULTS INDICATE THAT YOU WERE NOT SUCCESSFUL TODAY IN CONTROLLING YOUR DIABETES."

   b. As the physician you also want to train the patient to accept responsibility for poor results and be motivated to do something about it. In order to begin this task you first may need to adjust the patient's regimen so that they can no longer use the regimen as an excuse for their poor results. Assess the difficulty of the regimen for their poor results. Assess the difficulty of the regimen with the patient by saying: "IN ORDER TO HELP YOU CONTROL YOUR DIABETES BETTER LET'S DISCUSS THE DIFFICULTY OF YOUR TREATMENT PLANS. IF YOU WERE TO TRY REALLY HARD TO STAY ON THE DIET YOU HAVE, DO YOU THINK YOU COULD FOLLOW IT?"

      Ask similar questions about medication, exercise, etc. After this discussion you may find that the patient may need modifications in their regimen. Do so, using your best medical judgment. Remember, the intent of this discussion is to eliminate any causes outside the patient's control (i.e., the patient can no longer say "I am not getting good results because it is too hard for me").

   c. In order to help the patient recognize the importance of their role restate the results and suggest that these results are due to insufficient effort, i.e., "THE RESULTS WHICH YOU GOT TODAY INDICATE THAT YOU ARE NOT CONTROLLING YOUR DIABETES WELL. PERHAPS THE REASON FOR THESE POOR RESULTS ARE THAT YOU DID NOT TRY HARD ENOUGH TO FOLLOW YOUR TREATMENT PLANS. SOMETIMES THIS IS NOT EASY, BUT IN ORDER TO OBTAIN SUCCESSFUL RESULTS AND CONTROL YOUR DIABETES YOU MUST TRY REAL HARD, AND PUT FORTH THE NECESSARY EFFORT."

d. You also want to train the patient to recognize the physical causes of their non-successful results. In order to accomplish this, identify to the patient the two most likely physical causes for their non-successful diabetic control results. For example, state: "THE RESULTS WHICH YOU OBTAINED TODAY INDICATED THAT YOU DID NOT CONTROL YOUR DIABETES WELL, PROBABLY OCCURRED BECAUSE YOU DID NOT FOLLOW YOUR DIET, AND YOU DID NOT TAKE YOUR MEDICATION AT THE REGULAR TIME."

e. Talk to the patient until s/he clearly understands the instruction you have provided. Then before closing the conversation summarize your remarks. For example, state: "REMEMBER YOU WANT TO GET _____ RESULTS IN ORDER TO CONTROL YOUR DIABETES. IN ORDER TO ACCOMPLISH THIS YOU SHOULD TRY REAL HARD, PUT FORTH YOUR BEST EFFORT TO FOLLOW YOUR DIET AND TAKE YOUR MEDICATION AT THE REGULAR TIME."

f. Close the conversation and fill out the physician questionnaire found on the back of the patient daily report for today.

TREATMENT PHYSICIAN TRAINING (cont'd)

PATIENTS IN FEEDBACK ONLY TREATMENT

PURPOSE:

1. To provide patients with clear feedback on their Diabetic Control.

2. To train the patient to recognize feedback cues about their Diabetic Control.

PROCEDURES:

1. Complete the "data collection" sequence (see training for Pre-Post Test physicians) to determine:

   a. Success/non-success of diabetic control.

   b. Physical causes of diabetic control results.

2. If diabetic control results indicates Success:

   a. You want the patient to recognize their success and the cues indicating their success, so state: "YOUR RESULTS INDICATE THAT YOU ARE CONTROLLING YOUR DIABETES WELL. YOU NEEDED TO GET _____ RESULTS, AND YOU GOT _____ RESULTS. THESE RESULTS INDICATE THAT YOU WERE SUCCESSFUL TODAY IN CONTROLLING YOUR DIABETES."

   b. Respond to any questions, and close the phone conversation.

3. If diabetic control results indicate Non-Success:

   a. You want the patient to recognize their lack of success and the cues indicating these results, so state: "YOUR RESULTS INDICATE THAT YOU ARE NOT CONTROLLING YOUR DIABETES WELL TODAY. YOU NEEDED TO GET _____ RESULTS, BUT YOU GOT _____ RESULTS. THESE RESULTS TELL ME THAT YOU DID NOT CONTROL YOUR DIABETES WELL TODAY."

   b. Proceed with the normal patient management process, e.g., suggest changes in diet, medication, etc.

4. Fill out the physician questionnaire found on the back of the patient daily report for today.

TREATMENT PHYSICIAN TRAINING (cont'd)

FOR PATIENTS IN NO PHYSICIAN CONTACT TREATMENT

PURPOSE:

To provide standard medical treatment for the diabetic patient.

PROCEDURES:

During the treatment phase of the research, patients in this treatment will be contacted by the office staff to report their diabetic control results. There will be no contact initiated by the doctors. But the patient will have access to a physician as they would normally being a patient in the Family Practice Program.

If one of these patients wishes to talk to a doctor or make an appointment with the doctor, they will be free to do so.

If one of the patients in this treatment group contacts you, provide normal medical care for them.

APPENDIX D

INSTRUMENTS USED IN THE FULL STUDY

APPENDIX D

INSTRUMENTS USED IN THE FULL STUDY

Name_____ Date _____

HEALTH BELIEF QUESTIONNAIRE

DIRECTIONS: Everyone has certain beliefs about diabetes and what helps them to feel better. Below are a list of statements that some people believe about diabetes and the benefits of treatment. Since this is a survey of feelings or beliefs please indicate your agreement with these statements regardless of what you think other people want you to say.

There are no right or wrong answers!

Items are to be rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Diagree

1. A consistant amount of exercise is important to the control of diabetes.

SA A U D SD

2. It is important for diabetics to take medications sometime during the day (timing is not important).

SA A U D SD

3. In order to control diabetes it is very important to eat extra food when you feel tense.

SA A U D SD

4. When illness such as the flu develops, the diabetic should increase the amount of food in this diet.

SA A U D SD

All items are to be rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Diagree

5. When having a Hyperglycemic reaction you may feel loss of hearing and chest pains.

SA A U D SD

6. When having a Hypoglycemic reaction (insulin reaction) you may feel loss of appetite, increase in thrist, and notice large amounts of sugar and ketones in your urine.

SA A U D SD

7. In case of a hypoglycemic (insulin) reaction, you should take fluids without any sugar and call the doctor.

SA A U D SD

8. In case of a hyperglycemic reaction you should stop taking medications immediately.

SA A U D SD

9. When having a hypoglycemic (insulin) reaction you may feel hunger, trembling, impaired visions, and faintness.

SA A U D SD

10. Stress is more important than any other factor in the control of diabetes.

SA A U D SD

11. When having a Hypoglycemic (insulin) reaction you may feel chest pains, and loss of hearing.

SA A U D SD

12. Diabetes can be defined as a condition occurring when the stomach does not digest the food you eat.

SA A U D SD

13. In order to control diabetes it is very important to eat less food when you loose your appetite.

SA A U D SD

All items are to be rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Diagree

14. Diabetes can be defined as a condition occurring when the body produces too many hormones to operate properly.

SA A U D SD

15. I would have to change too many habits to follow my diabetic treatment plans.

SA A U D SD

16. I believe that diabetes rarely contributes to more serious medical problems.

SA A U D SD

17. I have enough money to buy the things I need in order to follow my treatment plans.

SA A U D SD

18. My diabetes treatment is a lot of nonsense.

SA A U D SD

19. I worry so much about my job that I often cannot follow my diabetes treatment plans.

SA A U D SD

20. A person could do everything he is supposed to do to control his diabetes but it probably will not help much.

SA A U D SD

21. I believe that diabetes cannot cause me more health problems.

SA A U D SD

22. I worry so much about my family that I often forget to follow my treatment plans.

SA A U D SD

All items are to be rated using this key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Diagree

23. I have others around me at home who help me follow my diabetic treatment plans.

SA A U D SD

24. I do not have enough money to buy the foods I need to follow my treatment plans.

SA A U D SD

25. It takes too much from my personal life to follow my diabetic treatment plans.

SA A U D SD

26. My job and the people I work with do not interfere with me following my treatment plans.

SA A U D SD

DIRECTIONS: For questions 27 through 31, find the answer which you believe most and circle it.

27. When you compare diabetes with a Heart Attack, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

28. When you compare diabetes with a Cold, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

29. When you compare diabetes with Tooth Cavities, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

30. When you compare diabetes with Ulcers diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

31. When you compare diabetes with the Flu, diabetes is

Much Less Serious	Less Serious	About the Same	More Serious	Much More Serious

CONSENT FORM FOR DIABETIC PATIENT EDUCATION STUDY

1. I have freely consented to take part in a study being conducted by Michael Radke under the supervision of Dr. Crow at E. W. Sparrow's Family Practice Clinic, and Dr. Byers from Michigan State University.

2. The study has been explained to me and I understand the explanation that has been given and that my participation will involve:

   a. testing my urine for sugar and ketones,
   b. filling out a short questionnaire each day,
   c. reporting my answers to the questionnaire three times each week for five weeks,
   d. talking to a doctor on the phone periodically,
   e. responding to one questionnaire, and
   f. one return visit to the doctor's office, at the doctor's request.

3. I understand that I am free to discontinue my participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous.

5. I understand that my participation in the study may provide, but does not guarantee, any beneficial results to me.

6. I understand that, at my request, I can receive additional information about the study after my participation is completed.

Signed _____

Date _____

Witness _____

PATIENT NAME _____ NURSE PATIENT INITIAL INTERVIEW

NURSE'S NAME _____ DATE: _____

DIRECTIONS: Fill out this form after you have completed the interview. It is important that you be as specific as possible. It is also important to include your impressions and feelings or inclinations about the patient. When you report impressions please label them, i.e., "My feeling was . . ."

1. What is the patient doing to maintain or lower his/her weight? e.g., Exercise, dieting, attending weight watcher support group, etc.

   _____

   _____

2. What is the patient's exact weight? _____

3. What medication does the patient report taking?_____

4. How much of each medication does the patient report taking?

   _____

5. What medication should the patient be taking according to their chart? _____ How much? _____

6. Do you think this patient can regulate the routing aspects of their diabetes? _____ Why: (Be specific if possible) _____

   _____

   _____

7. Does the patient's financial position allow them to purchase necessary supplies to maintain a regimen? _____

   _____

8. Does the patient's social/family environment support compliance? Why? _____

   _____

9. Is there any reason why this patient could not follow a diabetic regimen? _____ Physically? _____ Emotionally? _____ Socially? _____ Intellectually? _____ Why (specifics)? _____

   _____

10. Other important observations? _____

    _____

Name_____ Date _____

THE FULL STUDY

PRE-POST TEST

DAILY REPORT FORMS

DIRECTIONS: Answer each question by marking the most correct response.

1. What time did you conduct your first urine test? _____
2. What was your glucose result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++
3. What was your ketone result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++
4. What time did you conduct your second urine test?_____
5. What was your glucose result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++
6. What was your ketone result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++
7. How many reactions have you had in the last 24 hours? 0 1 2 3

DIRECTIONS: Indicate how many times you ate each of these foods today.

8. Candy __0 __1 __2 __3 or more
9. Cake, pie, donut __0 __1 __2 __3 or more
10. Sugar __0 __1 __2 __3 or more
11. Sugar sweet pop __0 __1 __2 __3 or more
12. Wine or liquor __0 __1 __2 __3 or more
13. Other foods containing sugar __0 __1 __2 __3 or more
14. Other foods not on your diet __0 __1 __2 __3 or more
15. Between meal snacks __0 __1 __2 __3 or more
16. These results indicate that you were _____ in controlling your diabetes
    (a) Successful (b) Not Successful

DIRECTIONS: Indicate which choice most affected your results today.

17. The results are because of: _____ How hard I tried, or
    _____ How easy or difficult the task is
18. The results are because of: _____ How my luck went today, or
    _____ How well I am able to perform the task
19. The results are because of: _____ How easy or difficult the task is, or
    _____ How my luck went today
20. The results are because of: _____ How hard I tried, or
    _____ How my luck went today
21. The results are because of: _____ How easy or difficult the task is, or
    _____ How well I am able to perform the task
22. The results are because of: _____ How hard I tried, or
    _____ How well I am able to perform the task

DIRECTIONS: Select the best choice from the list of factors below.

(a) Medication (c) Diet (e) Stress
(b) Exercise (d) General Health

23. Which factor was most responsible for today's results? _____
24. Which factor was second most responsible for today's results? _____
25. Which factor was third most responsible for today's results? _____
26. Which factor was fourth most responsible for today's results? _____
27. Which factor was least responsible for today's results? _____

Physician Name_____

DIRECTIONS: Select the best choice from the list of factors below.

(a) Medication (c) Diet (e) Stress
(b) Exercise (d) General Health

1. Which factor was most responsible for today's results? _____
2. Which factor was second most responsible for today's results? _____
3. Which factor was third most responsible for today's results? _____
4. Which factor was fourth most responsible for today's results? _____
5. Which factor was least most responsible for today's results? _____
6. "I would consider this patient's results today _____."
   VERY SUCCESSFUL 1 2 3 4 5 6 7 8 9 10 VERY UNSUCCESSFUL

7. What changes (if any) did you make in this patient's regimen?

_____

_____

_____

Name_____ Date _____

THE FULL STUDY

FEEDBACK AND NO CONTACT DAILY REPORT FORM

DIRECTIONS: After you have completed your urine tests, immediately fill out this questionnaire.

1. What time did you conduct your first urine test? _____

2. What was your glucose result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++

3. What was your ketone result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++

4. What time did you conduct your second urine test? _____

5. What was your glucose result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++

6. What was your ketone result? ___ Negative ___ Trace ___ + ___ ++ ___ +++ ___ ++++

7. How many reactions have you had in the last 24 hours? __0 __1 __2 __3

DIRECTIONS: Indicate how many times you ate each of these foods in the last 24 hours.

8. Candy __ 0 __ 1 __ 2 __ 3 or more

9. Cake, pie, donut __ 0 __ 1 __ 2 __ 3 or more

10. Sugar __ 0 __ 1 __ 2 __ 3 or more

11. Sugar sweet pop __ 0 __ 1 __ 2 __ 3 or more

12. Wine or liquor __ 0 __ 1 __ 2 __ 3 or more

13. Other foods containing sugar __ 0 __ 1 __ 2 __ 3 or more

14. Other foods not on your diet __ 0 __ 1 __ 2 __ 3 or more

15. Between meal snacks __ 0 __ 1 __ 2 __ 3 or more

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16. Consider all of the results you have reported today, would you say:

____ (A) My diabetes <u>was</u> successfully controlled

____ (B) My diabetes <u>was not</u> successfully controlled

PHYSICIAN NAME_____

DIRECTIONS: Select the best choice from the list of factors below.

(a) Medication (c) Diet (e) Stress
(b) Exercise (d) General Health

1. Which factor was most most responsible for today's results? _____
2. Which factor was second most responsible for today's results? _____
3. Which factor was third most responsible for today's results? _____
4. Which factor was fourth most responsible for today's results? _____
5. Which factor was least most responsible for today's results? _____

6. What changes if any did you make in this patient's regimen?

_____

_____

7. I would consider this patient's results today _____?
VERY SUCCESSFUL 1 2 3 4 5 6 7 8 9 10 VERY UNSUCCESSFUL

8. Today I provided this patient with the correct instruction as outlined.
ABSOLUTELY 1 2 3 4 5 6 7 8 9 10 NOT AT ALL

PATIENT NAME_____

REGIMEN DIFFICULTY

ASSESSMENT FORM

PHYSICIAN: _____

DIRECTIONS: Indicate how difficult each of the following factors make the diabetic regimen prescribed for this particular patient.

1. The Diet portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

2. The Medication portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

3. The Exercise portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

4. The General Health portion of the regimen makes this patient's regimen:

   Very Easy 1 2 3 4 5 6 7 8 9 10 Very Difficult

5. The Stress portion of the regimen makes this patient's regimen: