
Chen-Yen Wang
To the Graduate Council:

I am submitting herewith a thesis written by Chen-Yen Wang entitled "Health and illness self-care in adults with non-insulin dependent diabetes : a rest of Orem's theory of self-care." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nursing.

Mildred Fenske, Major Professor

We have read this thesis and recommend its acceptance:

Martha Alligood, Kathleen Conlon

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)
To the Graduate Council:

I am submitting herewith a thesis written by Chen-Yen Wang entitled "Health and Illness Self-Care in Adults with Non-Insulin-Dependent Diabetes: A Test of Orem's Theory of Self-Care." I have examined the final copy of this thesis and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Nursing.

Mildred Fenske, Major Professor

We have read this thesis and recommend its acceptance:

Martha K. Waggoner
Kathleen D. Coxlow

Accepted for the Council:

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Associate Vice Chancellor
and Dean of The Graduate School
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Signature  Chen-Yen Wang

Date  4-27-95
HEALTH AND ILLNESS SELF-CARE
IN ADULTS WITH NON-INSULIN DEPENDENT DIABETES:
A TEST OF OREM'S THEORY OF SELF-CARE

A Thesis
Presented for the
Master of Science in Nursing
Degree
The University of Tennessee, Knoxville

Chen-Yen Wang
May 1995
DEDICATION

This work is dedicated to my father, Wen-Chang Wang; his love, humor, and encouragement provided me with the incentive to meet my professional goals.
ACKNOWLEDGMENTS

I would like to express my sincere appreciation to Dr. Fenske for her encouragement and guidance. I also appreciate Dr. Alligood and Mrs. Conlon who served as my committee. Appreciation also goes to Mrs. Bowers for her assistance and support in taking respondents' addresses.

I am grateful to Mrs. Bronzini, Program Director, University of Tennessee Medical Center at Knoxville Diabetes Center, Mrs. Perry-Burst, Director of Nutrition Services, Knox County Health Department, and Mr. Casalenuovo, Clinical Specialist in Diabetes, Methodist Medical Center of Oak Ridge, for announcing this study in their educational programs for diabetics.

Lastly, I also appreciate all the Type II diabetics who enthusiastically participated in this study.
ABSTRACT

This study examined the health and illness self-care of 57 (32 females, 25 males) subjects with Type II diabetes mellitus and their health, universal self-care, and health-deviation self-care behaviors. Subjects, except 1, were white; the majority were currently married (74%) and retired (65%).

Orem's theory of self-care guided the selection of the variables and the hypothesized outcomes. Denyes Self-Care Practice Instrument and Denyes Health Status Instrument were used to measure universal self-care behaviors and health, respectively. The modified Diabetic Self-Care Practice Instrument was used to measure health-deviation self-care behaviors. An investigator developed questionnaire assessed sociodemographic characteristics.

Findings included positive correlations between universal self-care and health, health-deviation self-care and universal self-care, health-deviation self-care and health, universal self-care and age, universal self-care and sleep hour, age at onset of diabetes mellitus and health-deviation self-care, age at onset of diabetes mellitus and universal self-care, and age
at onset of diabetes mellitus and health; and negative correlations between duration of diabetes mellitus and health-deviation self-care, duration of diabetes mellitus and age of subjects, health-deviation self-care and metabolic control, and universal self-care and metabolic control.

Significant differences were found among some of the groups in relation to health-deviation self-care and source of support and universal self-care and source of support. Subjects who received support from a friend in addition to family support reported higher universal self-care behaviors than those without support. Health explained 76% of variance in universal self-care behaviors while support system explained 16% of variance in the health-deviation self-care.

Recommendations for future research and for nursing interventions included increasing the number of subjects with Type II diabetes mellitus to generalize findings, further inquiry regarding the number and source of support to facilitate health-deviation self-care behaviors and continued assessment of the source of support and perception of health state to facilitate self-care behaviors.
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CHAPTER I
INTRODUCTION

Currently 6.5 million, 3 out of every 100, Americans have the diagnosis of diabetes mellitus. The number of persons with diabetes mellitus continues to increase every year by about 26 cases per 10,000 people (American Diabetes Association, 1993, p. 13). The treatment of diabetes-related medical complications costs millions/annum (Fitzpatrick, Taunton, & Jacox, 1992). Several studies have explored the knowledge level of persons with diabetes mellitus and the ways perception of the diabetic regimen affect the patients' performance of self-care. Carlson & Rosenqvist (1991) found that the subjects' level of education significantly correlated with adherence, 37% of patients in the intervention group compared to only 23% of patients in the control group self-monitored their blood glucose. Brown (1990) reviewed studies related to diabetes education and found education affected both patient knowledge and glucose control. Although relationships between perceptions about diabetes mellitus and regimen-related behavior have been studied, no conclusive findings regarding self-care behaviors have been reported because the studies failed to distinguish the type of diabetes mellitus, study sufficient numbers
of subjects, or explicate the relationship between self-regulation and metabolic control (Hamera, 1992).

Frey and Denyes (1989) tested Orem's theory regarding the distinction between universal self-care and health-deviation self-care in adolescents with insulin-dependent diabetes mellitus (IDDM). They found a negative correlation between age and universal self-care and a positive correlation between health deviation self-care and metabolic control. Long-term elevated glucose levels led to medical complications. Although the developmental processes of complications are the same for insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM), most studies regarding self-care have excluded persons with NIDDM (Type II diabetes).

The purpose of this study was to examine relationships between universal self-care behaviors of adults with Type II diabetes mellitus and the basic conditioning factors; between health-deviation self-care behaviors and the basic conditioning factors; between universal self-care behaviors and health; and between health-deviation self-care behaviors and health.
Theoretical framework

Orem's self-care model of nursing comprises three theories: theory of self-care, theory of self-care deficit, and theory of nursing systems (Orem, 1991). This study only examined the theory of self-care. The theory of self-care provides a framework for self-care and self-care agency which together predict the health state (Denyes, 1988). This study builds on Frey and Denyes's (1989) earlier work regarding health and illness self-care in adolescents with IDDM, but with a population of NIDDM adults. According to Orem, self-care is action through which individuals maintain rational life and health. Individuals learn this conduct through interpersonal relations and communications. Therapeutic self-care demand refers to the necessary self-care actions performed by the individuals in order to meet known self-care requisites.

Orem (1991) identified three types of self-care requisites: universal, developmental, and health-deviation. Universal requisites include the sufficient intake of air, water, and food and daily activities such as elimination, rest, and social interaction including avoiding harm and the promotion of well-being and normalcy. Universal requisites are basic needs for all
persons. Health-deviation requisites involve rehabilitation from the specific illness, disease, or disability. To reach optimal well-being, individuals need to seek appropriate health care, adhere to their care regimen, and understand pathological states of illness, accept their state of health, and learn about living with the effects of illness.

Orem (1991) states that basic conditioning factors modify the individual's universal self-care. Although she identifies "health state" as a basic conditioning factor which influences self-care, she does not identify the relationship between the basic conditioning factors and health-deviation self-care.

The deviation of health for the person with diabetes mellitus arises from the pathophysiology of disease. Individuals with diabetes mellitus have a deviation from normal structural integrity. They lack the ability to regulate their blood glucose within the normal range. Prolonged abnormal glucose levels impair structural and functioned integrity. For primary prevention, persons with diabetes mellitus need to perform therapeutic self-care actions. However, basic conditioning factors may affect universal self-care in people with NIDDM. The findings of this study provide further insight regarding
ways nurses can assist persons with diabetes mellitus with their self-care.

Statement of the Problem

Diabetes mellitus, one of the leading causes of death, is linked to many medical complications. Ninety percent of all individuals with diabetes mellitus are non-insulin dependent. NIDDM is associated with genetic transmission, a sedentary life style, parity, obesity, and aging. Since there is no cure for diabetes, the control of NIDDM depends upon self-care.

Definitions

1. Universal self-care (USC): the practice of activities to maintain the integrity of human structure and functioning and general well-being (Orem, 1991, p. 125), as measured by the Denyes Self-Care Practice Instrument (DSCPI).

2. Health-deviation self-care: that self-care associated with disease (Orem, 1991, p. 120), diabetes and its effects, as measured by the modified Diabetic Self-Care Practice Instrument (DiSCPI).

3. Health: a state of wholeness or soundness (Orem, 1991, p. 181), an outcome of USC, as measured by Denyes Health Status Instrument (DHSI).
4. **Basic conditioning factors (BCF):** internal or external factors that affect an individual's ability to engage in self-care (Orem, 1991, p. 136), such as social support, duration of disease, education level, marital status, physical activity, blood glucose level, sleeping hours, environment, employment, calories, race, and age.

5. **Non-insulin-dependent diabetes mellitus (NIDDM):** common form of diabetes mellitus in which persons control their blood glucose with oral agents, or diet, or weight, or combinations of these.

6. **Primary prevention:** self-care behaviors to maintain and promote integrity of structure and functioning and the prevention of specific diseases (Orem, 1991, p. 194).

7. **Self-care agency:** "human capabilities of individuals to perform actions to take care of themselves and others" (Orem, 1991, p. 145).

8. **Diabetic regimen:** a management plan for blood glucose control and for the primary prevention.

9. **Control of pathology:** metabolic control, an outcome of HDSC, as measured by self-monitored level of blood glucose.
Assumptions

Basic assumptions in this study include:

1. Persons with NIDDM are able and willing to care for themselves unless self-care deficits occur at which time they are responsible for seeking needed help.
2. Persons with diabetes can perform primary prevention.
4. Health relates to the functions of self-care agency.
5. Nursing helps the patient accomplish therapeutic self-care by oneself or with help of significant others.
6. Nursing interventions include assessing the patient's ability and limitation of self-care, planning mutual goals and interventions toward self-care, evaluating patient's glucose control and other self-care behaviors, and revising care plans.

Hypotheses

2. Universal self-care directly and positively affects health.
3. BCF influence health deviation self-care.

Limitations and Delimitations

The study sample included only subjects who willingly volunteered to participate and responded in an accurate and timely fashion. The study sample was delimited to persons with non-insulin-dependent diabetes. The findings of this study are limited to non-insulin-dependent diabetics who not only volunteered to participate in this study, but who read newspapers and/or posters, or belong to an organization emphasizing diabetes.

Organization of Thesis

This thesis is divided into 5 chapters. Chapter I has introduced the study's topic, delineated its scope and assumptions, and defined significant terms. Literature related to Orem's theory of self care, help seeking behavior, perception of diabetes, and adjustment to chronic illness is reviewed and discussed in Chapter II. A description of the subjects, explanation of data collection and analyses, and the instruments used to collect the data follows in Chapter III. In Chapter IV, the findings of the study are reported and interpreted.
A summary, conclusions, and implications for further research in Chapter V conclude the study.
CHAPTER II
REVIEW OF LITERATURE

Introduction

Diabetes mellitus affects 6 out of 100 Americans over the age of 20 (Fain, 1993). Persons with diabetes mellitus must assume responsibility for the management of their care. Nursing management of diabetics primarily involves patient education. However, little care is directed toward promotion of health. To promote self-care behavior, there is a need to examine the relationship between self-care and health. Therefore, this literature review includes individuals' perception of diabetes, help seeking behaviors, adjustment to chronic illness, and health-deviation self-care.

Perception of Diabetes

To examine the effect of perception of diabetes on self-care, Luyas (1991) used an exploratory model to study NIDDM. She explored the biological and cultural factors influencing the self-care of low-income diabetic Mexican American Women. Individuals in her study perceived "sugar diabetes" (diabetes mellitus) as table sugar (sucrose) in the blood. They also perceived biological complications from diabetes as amputations, loss of eyesight, and being attached to the machine.
(dialysis). They believed that eating sweet food causes the accumulation of sugar in the blood and that family crises trigger acute episodes of hyperglycemia. Thus, these subjects checked urine sugar mainly during periods of crisis. In another study (Polly, 1992), older people with NIDDM perceived that they will loose limbs, become blind, and die of diabetes with or without treatment.

The knowledge level and perception of the diabetic regimen affects the patients' performance of self-care. Subjects perceived the prescribed diet as requiring special "diabetic" or "weight watchers" food (Luyas, 1991), foods these low-income diabetics could not afford to buy. Further, they perceived they needed food to provide energy to work and for other activities rather than for cellular body metabolism. They opposed losing weight because they desired a body weight higher than the biomedical norm. They believed that only insulin "works" to control diabetes; oral medication does not. Overall, they complied with their parenteral insulin prescriptions, but not with prescriptions for diet, weight loss, and exercise.

In summary, biological and cultural factors influence individuals' self-care. They affect the diabetics' knowledge level, perception of diet, blood
glucose control, ideal body weight, and diabetic complications and treatments.

Help Seeking

An assumption of this study is that persons are responsible for seeking needed help. When individuals do not comprehend the severity of long-term complications, they demonstrated poor glycemia control (Polly, 1992). Brown (1990) reviewed studies related to diabetes education and found that patient education has a moderate to large effect on improving patient knowledge and glucose control. However, diabetics reported the amount of new information overwhelmed them and provided comments indicating that education needs to be at the level of the learners and on a continuous basis. Although exercise greatly influences, in a positive way, the management of diabetes, 43% of the subjects in one study (Searle & Ready, 1991) refused to participate in an exercise program and only 36% expressed an interest in participating in a formal exercise program. Although only 31% of the subjects reported that they received information regarding exercise from their physicians, Searle and Ready (1991) concluded the primary source of such information should be the patient's personal physician.
A retrospective study of oral agent treated Type II diabetics revealed that individuals who perceived more barriers and fewer benefits of treatment demonstrated poor weight control, poor treatment satisfaction, and poor diabetic control (Lewis, Jennings, Ward, & Bradley, 1990). Adherence to the prescribed regimen itself reinforces further education and positively influences management. In contrast, patients with good metabolic control experienced positive feedback from the care team (Wikblad, 1991). Coping with the uncertainty related to potential complications requires a willingness and ability to adapt (Nyhlin, 1990); education increases coping and adaptive behaviors.

In summary, the perceived severity of diabetes and failure to maximize the benefits of education hinder persons with diabetes mellitus from seeking help. To design effective care regimens, healthcare providers must understand the diabetic's perception of glucose control. In other words, each person with diabetes requires individualized care.

Adjustment to Chronic Illness

In a self-help model for patients with chronic illness, Braden (1990) discussed the variables of self-help and described a negative association of self-help
with disability, diagnosis, severity of illness, and uncertainty. He found patients with higher incomes and who attended self-help classes exhibited greater self-help. Self-care behavior is the process through which persons with diabetes mellitus not only demonstrate an adherence to the treatment regimen, but also exercise preventive measures to avoid or delay complications. Wooldridge et al. (1992) suggested that adherence behaviors related to diet and self blood glucose monitoring influence metabolic control (blood glucose levels) more than other behaviors. However, these investigators found no conclusive evidence about the relationship between health beliefs and metabolic control.

In contrast, O'Connell et al. (1990) found symptom beliefs (symptoms diabetics believe best indicates high or low blood glucose levels), not the actual blood glucose levels influence regimen-related behaviors. Another study (Connell, Storandt, & Lichty, 1990) reported higher levels of self-care among those who perceived more benefits of self-care and those who desired more diabetes-specific social support. The availability of general support enhanced metabolic control by increasing self-care behavior. NIDDM subjects
perceived greater family social support and self-care behaviors than did Type I (IDDM) individuals (Kvam & Lyons, 1991).

In summary, adjustment to chronic illness helps persons with diabetes adhere to the treatment regimen. Both family and social support help them to cope with chronic illness. Therefore, it is important to study the influence of support on the self-care behaviors.

**Health-Deviation Self-Care**

Orem (1991) defined the requisite capabilities and refers to the ultimate capabilities of self-care agency necessary for self-care operations. She says, in the process of self-care operations, individuals assess their environment and self for resources, make decisions for action, and act to meet self-care requisites. Responsibilities related to diabetes mellitus involve controlling hypoglycemia and hyperglycemia, adjusting activity level, and maintaining good general hygiene and good health habits. Self-care includes: skin care, checking for infections and skin lesions, measuring glucose levels, taking medications, adhering to the prescribed diet, controlling calories, monitoring symptoms of hyperglycemia and hypoglycemia, and recording glucose levels and dietary intake between clinic visits.
Germain & Nemchik (1988) used Orem's self-care framework to examine the relationship between diabetes self-management and hospitalization. They found persons with better diabetes self-management had a lower incidence of rehospitalization. Frey and Denyes (1989) using Orem's theory studied the effects of BCF on the universal self-care and health deviation self-care and the relationships among BCF, universal self-care, and health. Fitzgerald (1980) designed an educational program for persons with diabetes using Orem's self-care nursing mode. She reported that persons with diabetes mellitus who assume responsibility for self-care reflect the success of an educational program. To stimulate self-care action, the individual's desire and motivation to adjust to a chronic disease, cognitive skills, and knowledge to manage the disease must be acknowledged. Therefore, education must focus on integrating the diabetic's perceived needs and goals in relation to self-care and the knowledge of the disease process and its management.

Gast's group (1989) explored three types of self-care capabilities: (1) Foundational: (a) sensation, (b) perception, (c) memory, and (d) orientation; (2) Power components, enabling self-care: (a) self-care skills, (b) the valuing of health, (c) energy for self-care, (d)
self-care knowledge; and (3) Requisite: (a) assessment of environment for resources, (b) decision-making to meet one's self-care requisites, and (c) performance of measures to meet one's self-care requisites. Power components and requisite self-care capabilities are similar to the self-care agent and self-care requisites of Orem Self-Care Model.

Health professionals help individuals cope with diabetes mellitus and its management by assisting them to increase their independence through improved decision-making and problem-solving skills. Before designing an educational program, a nurse must possess indepth knowledge of diabetes and its management and the impact of diabetes on life-style and evaluate the attitude toward chronic illness of each person with diabetes mellitus. In addition, nurses must understand and consider the individual's values, strengths, limitations, learning needs, and learning readiness. Furthermore, the diabetic's ability to maintain adequate nutrition, elimination, and social interaction and prevent hazards to life and well-being must be determined.

Summary of Literature Review

Persons with diabetes mellitus perceive their disease as one of losses (Luyas, 1991). Biological and
cultural factors influence the self-care of low-income diabetics. The knowledge level and perception of the prescribed regimen also affect the diabetic's performance of self-care. In addition, social support and adjustment to chronic illness facilitate self-care. In the process of self-care operations, individuals explore their environment and themselves, make decisions for their actions, and perform measures to meet their self-care requisites.

Research has shown that a number of potentially disabling complications suffered by people with diabetes may be delayed or prevented by maintenance of close-to-normal blood glucose control. Tight control reduces damage to the eyes by 76%, to the kidneys by 39 to 54%, and to the nerves by 60% (Diabetes Control and Complications Trial Research Group, 1993).
CHAPTER III

METHOD

Introduction

This study examined the relationship between universal self-care behaviors of adults with Type II diabetes mellitus and the basic conditioning factors; between health-deviation self-care behaviors and the basic conditioning factors; between universal self-care behaviors and health; and between health-deviation self-care behaviors and health.

Persons with NIDDM were selected as subjects because 90% of all individuals with diabetes mellitus are NIDDM (American Diabetes Association, 1993). In the absence of a cure for diabetes, the control of NIDDM depends upon self-care.

Research Design

The study used a descriptive correlational design. This study extended Frey and Denyes's (1989) study. This study examined the relationships among USC, HDSC, BCF, and health in adults who control their blood glucose with oral agents, instead of in adolescents with insulin-dependent diabetes (Frey & Denyes, 1989).

This study examined health as one of BCF with Denyes Health State Instrument (DHSI-90), rather than with the
Brief Symptom Inventory (Derogatis & Spencer, 1982) used by Frey and Denyes, because Orem (1991) describes health as the state of wholeness or integrity of human beings; she states "Health is a state of physical, mental, and social well-being and not merely the absence of disease or infirmity" (p. 236). Orem conceptualized health as having anatomic, physiologic, and psychological features; her set of basic conditioning factors includes health and the health care system. The health symptoms inventory indicates the number of symptoms and the intensity of distress (Frey & Denyes, 1989); whereas the DHSI measures one's perceived general state of health as well as specific dimensions of health (e.g. nutrition status). This study also modified the scale of Diabetic Self-Care Practice Instrument (DiSCPl) by changing the responses from percentage of time ranging from 0 to 100 to always, more than 1/2 of the time, about 1/2 of the time, less than 1/2 of the time, and never.

Subjects

Subjects responded to announcements posted on the bulletin boards of selected local pharmacies, to an advertisement in a local Sunday newspaper, and to an invitation to participate in the study published in newsletters regarding diabetes mellitus. The target
subjects included adults with the diagnosis of diabetes mellitus and who have a prescription for an oral medication to control their blood glucose level.

**Instruments**

Demographic data of subjects including gender, living environment, social interaction, decision-making, marital status, occupation, education, duration of diabetes, race, and daily physical activities were obtained by an investigator developed questionnaire (Appendix I). Information regarding general health behaviors (e.g., taking good care of one's health) and specific self-care behaviors (e.g., eating and exercise behaviors) were obtained using the Denyes Self-Care Practice Instrument (DSCPI). The DSCPI contains 18 statements scored on a scale of 0 to 100. The alpha coefficient (unspecified) for the DSCPI, developed by Dr. Denyes, ranged from 0.82 to 0.89, compared to a Cronbach's alpha of 0.88 for this group of subjects. The test-retest reliability of this instrument at 3 weeks was 0.70 (Frey & Denyes, 1989).

Health was measured by the Denyes Health Status Instrument (DHSI-90). The DHSI, a 10-item instrument, measures one's perceived general state of health and specific dimensions of health. The score for each item
ranges from 0 to 100; the alpha coefficients (unspecified) ranged from 0.79 to 0.88 (Frey & Denyes, 1989), compared to a Cronbach's alpha coefficient of 0.90 for the group of subjects in this study.

Health-deviation self-care behaviors were measured by the Diabetic Self-Care Practice Instrument (DiSCPI). The DiSCPI, developed by Frey & Denyes (1989), measures health-deviation requisites: (1) awareness and prevention of effects and results of the diabetes and (2) adherence to prescribed therapeutic measures. The DiSCPI, a 22-item instrument, measures diabetes-related self-care behaviors. The score for each item ranges from 0 to 100. The alpha coefficient (unspecified) for the DiSCPI was 0.73 (Frey & Denyes, 1989), compared to a Cronbach's alpha coefficient of 0.80 for this group of subjects. Frey & Denyes (1989) reported a test-retest reliability of 0.70 at 3 weeks. The modified DiSCPI instrument used for this study contained 22 statements scored on a scale of 1 to 5.

Data Collection Procedures

Subjects responded to the announcements posted on the bulletin boards of selected pharmacies, to the paid advertisement regarding the study published in a local newspaper, and to an invitation to participate that was
printed in newsletters sent to diabetics who reside in the local area. The advertisement, announcement, and invitation listed the telephone number of a particular secretary in the College of Nursing that persons interested in participating in the study were to call. Within two days following the paid advertisement in the newspaper, 40 persons had indicated their interest in the study. The secretary collected the names and addresses of the respondents. I sent packets containing an explanation of the study, a consent to participate form, numerically coded questionnaires, and a pre-addressed, stamped brown envelope for returning the completed items to each respondent (N = 85), a 76% response rate.

To protect human subjects, I explained the study to the respondents and obtained their informed consent form (Appendix I) via written correspondence mailed to them. Respondents were requested to complete a total of 50 items on the questionnaires and return them to me by mail. When returned, the questionnaires were separated from the informed consent forms and return envelopes. The name and address of each potential subject was destroyed when they returned their questionnaires. At the conclusion of data gathering, the names and addresses of all respondents whether or not they returned their
questionnaires were destroyed. No follow-up letters were sent to respondents who did not return the questionnaires.

Data Analysis

The questions of this study were: (1) What is the relationship between universal self-care behaviors and the basic conditioning factors? (2) What is the relationship between health-deviation self-care behaviors and the basic conditioning factors? (3) What is the relationship between universal self-care behaviors and health status? and (4) What is the relationship between health-deviation self-care behaviors and health status?

Data were analyzed to make comparisons and discover relationships among variables. The Statistical Analysis System (SAS) software was used to compute and analyze the data. This computer software permitted computations of summary statistics, multiple correlations using the Pearson Product Moment Correlation Coefficient to determine relationships between USC and/or HDSC and basic conditioning factors, t-tests to differentiate the means in HDSC from different sub-groups of subjects, and hierarchy regression to determine the relative contribution of each of the basic conditioning factors on USC or HDSC. The level of significance was set at p< .05.
The statistical findings of this study were interpreted according to Orem's theory of self-care.
CHAPTER IV
RESULTS

The findings of this study will be presented in two sections. The first section presents descriptive data related to all respondents and descriptive statistics for the research sample. The second section contains the results pertaining to the hypotheses.

Descriptive Data

The descriptive data show the distribution of basic conditioning factors for the entire group of respondents. The respondents (n = 65) were recruited from 24 counties around Knoxville, TN and consisted of 36 females (55%) and 29 males (45%). Sixty-three of the respondents were white; two were black. Respondents ranged from 31 to 84 years of age with HDSC (M = 53.67, SD = 14.15). Five respondents returned questionnaires with incomplete DSCPI or DHSI. Three additional questionnaires were not used because of outlier scores of USC and HDSC. This adjustment reduced the number of counties in which subjects resided from 24 to 23, and sample size from 65 to 57. Frequency tables illustrate descriptive summaries of demographic data.

The age and gender difference in subjects are summarized in Table 1. Subjects ranged from 31 to 84
years of age without significant differences between male
\((M = 59, \ SD = 12.1)\) and female \((M = 57.4, \ SD = 12.5)\) at \(p = 0.05\) level. Half (50\%) of the subjects had a minimum
education level of high school graduate (Table 2). Most
subjects were retired (70\%) (Table 3) and currently
married (73\%) (Table 4); 74\% lived with someone who is
helpful (Table 5). None of the subjects reported living
with someone who is too helpful.

Forty-four percent of subjects walked 1 mile daily
(Table 6). The age at onset of diabetes for the subjects
ranged from age 31 to 74 \((M = 52.3, \ SD = 12.3)\) (Table 7).
Duration of diabetes varied from 1.5 months to 30 years;
50\% had diabetes diagnosed less than 4 years prior to the
study (Table 8).

Table 1. Age Distribution of Subjects by Gender

<table>
<thead>
<tr>
<th>Ages Ranges</th>
<th>n (Total = 57)</th>
<th>Percent</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 31-84</td>
<td>25</td>
<td>43.9</td>
<td>59.0</td>
<td>12.1</td>
</tr>
<tr>
<td>Female 37-74</td>
<td>32</td>
<td>56.1</td>
<td>57.4</td>
<td>12.5</td>
</tr>
</tbody>
</table>
Table 2. Education Level of Subjects

<table>
<thead>
<tr>
<th>Education Level</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Total = 57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade School</td>
<td>5</td>
<td>8.8</td>
</tr>
<tr>
<td>Some High School</td>
<td>6</td>
<td>10.4</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>16</td>
<td>28.1</td>
</tr>
<tr>
<td>Some College Graduate</td>
<td>15</td>
<td>26.3</td>
</tr>
<tr>
<td>College Graduate</td>
<td>14</td>
<td>24.6</td>
</tr>
<tr>
<td>Graduate School</td>
<td>1</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Table 3. Employment of Subjects

<table>
<thead>
<tr>
<th>Type</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Total = 57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full</td>
<td>13</td>
<td>22.8</td>
</tr>
<tr>
<td>Part</td>
<td>7</td>
<td>12.3</td>
</tr>
<tr>
<td>Retired</td>
<td>37</td>
<td>64.9</td>
</tr>
</tbody>
</table>
Table 4. Marital Status of Subjects

<table>
<thead>
<tr>
<th>Status</th>
<th>n (Total = 57)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divorced</td>
<td>6</td>
<td>10.5</td>
</tr>
<tr>
<td>Married</td>
<td>42</td>
<td>73.6</td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Separated</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Widow</td>
<td>5</td>
<td>8.8</td>
</tr>
<tr>
<td>Widower</td>
<td>2</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 5. Living Arrangement of Subjects

<table>
<thead>
<tr>
<th>Living Arrangement</th>
<th>n (Total = 57)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alone</td>
<td>8</td>
<td>14.0</td>
</tr>
<tr>
<td>Helpful</td>
<td>42</td>
<td>73.7</td>
</tr>
<tr>
<td>Not helpful</td>
<td>7</td>
<td>12.3</td>
</tr>
</tbody>
</table>
Table 6. Physical Activity of Subjects

<table>
<thead>
<tr>
<th>Type of Exercise</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Total = 57)</td>
<td></td>
</tr>
<tr>
<td>House Cleaning</td>
<td>18</td>
<td>31.6</td>
</tr>
<tr>
<td>Walking</td>
<td>25</td>
<td>43.8</td>
</tr>
<tr>
<td>Cycling</td>
<td>14</td>
<td>24.6</td>
</tr>
</tbody>
</table>

Table 7. Frequency Distribution of Age at Onset

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Total = 57)</td>
<td></td>
</tr>
<tr>
<td>31 - 35</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>36 - 40</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>41 - 45</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>46 - 50</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>51 - 55</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>56 - 60</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>61 - 65</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>66 - 70</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>71 - 74</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>
Table 8. Frequency Distribution of Duration of Diabetes

<table>
<thead>
<tr>
<th>Years</th>
<th>n (Total = 57)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 - 1.0</td>
<td>11</td>
<td>19.3</td>
</tr>
<tr>
<td>1.5 - 4.0</td>
<td>20</td>
<td>35.0</td>
</tr>
<tr>
<td>4.5 - 8.0</td>
<td>11</td>
<td>19.3</td>
</tr>
<tr>
<td>9.0 - 12.5</td>
<td>8</td>
<td>14.0</td>
</tr>
<tr>
<td>13 - 17.0</td>
<td>4</td>
<td>7.0</td>
</tr>
<tr>
<td>18 - 30.0</td>
<td>3</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Results Pertaining to the Hypotheses

Each hypothesis is restated and followed by the results pertaining to that hypothesis.

**Hypothesis 1:** Basic conditioning factors (BCF) influence universal self-care actions. Data were analyzed using descriptive statistics, Pearson's r and t-test (Table 9). Health was strongly correlated with USC (r = .84, p = .0001). Present age was positively related to USC (r = .32, p = .0138). Sleep hour was positively correlated with USC (r = .26, p = .0482). Although duration of diabetes was not significantly correlated with USC (r = -.072, p = .5930), the age at onset of diabetes...
diabetes was positively related to USC \( r = .36, p = .0054 \). As the age at onset increased, USC scores increased. Education level was not significantly related to USC \( r = .05, p = .6902 \).

Table 9. Correlations Between Each Basic Conditioning Factor and the Universal Self-Care Behavior Score

<table>
<thead>
<tr>
<th>BCF Variables with USC</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>.84</td>
<td>.0001*</td>
</tr>
<tr>
<td>Present Age of Subject</td>
<td>.32</td>
<td>.0138*</td>
</tr>
<tr>
<td>Sleep Hour</td>
<td>.26</td>
<td>.0482*</td>
</tr>
<tr>
<td>Age at Onset of NIDDM</td>
<td>.36</td>
<td>.0054*</td>
</tr>
<tr>
<td>Duration of NIDDM</td>
<td>-.07</td>
<td>.5930</td>
</tr>
<tr>
<td>Education Level</td>
<td>.05</td>
<td>.6902</td>
</tr>
</tbody>
</table>

* significant, \( p < .05 \)

Using Bonferroni T tests for variance analysis at alpha = .05, the subjects who received support from friends in addition to family had significantly higher USC scores than subjects who had no support (Table 10). Subjects who received support from family plus a friend had statistically significant higher USC scores than those without support. No significant differences of mean
scores in USC between persons who received support from diabetes support group and those without support were found. There was no significant difference in USC scores in terms of activity level, employment, or marital status.

Table 10. USC Scores among Groups with Different Sources of Support

<table>
<thead>
<tr>
<th>Source of Support Comparison</th>
<th>Difference Between Means</th>
<th>Bonferroni T Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Plus Friend vs. none</td>
<td>22.144*</td>
<td>&gt; 3.54707</td>
</tr>
<tr>
<td>Friend vs. none</td>
<td>3.817</td>
<td>&lt; 3.54707</td>
</tr>
<tr>
<td>Family vs. none</td>
<td>17.557</td>
<td>&lt; 3.54707</td>
</tr>
</tbody>
</table>

* significant at p = .05 level, df = 46.

However, analysis of variance (ANOVA) demonstrated a significant difference in USC scores in two groups of subjects with different living arrangements (Table 11). Subjects living alone or with someone helpful had significantly higher USC scores than those living with someone who was not helpful.

Stepwise multiple regression was used to analyze the independent variables of age, duration, level of
education, health, and sleep hour. Results demonstrated that health accounted for 76% of the variance in the universal self-care behaviors. No other variable met the 0.75 significance level. Hypothesis 1 is accepted.

Table 11. Comparisons of USC Scores in Living Arrangement Groups

<table>
<thead>
<tr>
<th>Living Arrangement</th>
<th>Difference Between Means</th>
<th>Bonferroni T Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Alone vs Live with Someone Helpful</td>
<td>4.293</td>
<td>&lt; 2.47085</td>
</tr>
<tr>
<td>Live Alone vs Live with Someone not Helpful</td>
<td>26.313*</td>
<td>&gt; 2.47085</td>
</tr>
<tr>
<td>Live with Someone Helpful vs Live with Someone not Helpful</td>
<td>22.014*</td>
<td>&gt; 2.47085</td>
</tr>
</tbody>
</table>

* significant at p = .05 level, df = 54.

**Hypothesis 2:** Universal self-care (USC) directly and positively affects health. Universal self-care strongly correlated positively with health ($r = .84$, $p = .0001$) (Table 9). Universal self-care behavior was a significant predictor of health, accounting for 76% of the variance. Hypothesis 2 was supported.

**Hypothesis 3:** BCF influence health-deviation self-care (HDSC). Fifty-six percent of the subjects were female and 44% were male, with USC scores ($M = 74.5$, $SD =$
14.4) and HDSC scores ($M = 57.8$, $SD = 9.2$). Data were analyzed using descriptive statistics, Pearson's $r$ and $t$-test (Table 12). Health was positively correlated with HDSC ($r = .40$, $p = .0018$). Both duration and age at onset of diabetes were significantly correlated with HDSC.

Duration of diabetes was negatively correlated with HDSC ($r = -.27$, $p = .0392$); age at onset of diabetes was positively related to HDSC ($r = .32$, $p = .0166$). Present age of subjects ($r = .18$, $p = .1850$), sleep hour ($r = .25$, $p = .0635$), and education level ($r = .13$, $p = .3464$) were not significantly related to HDSC.

Table 12. Correlations Between Each of the Basic Conditioning Factors and the Health-Deviation Self-Care Behaviors

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>.40</td>
<td>.0018*</td>
</tr>
<tr>
<td>Present Age of Subjects</td>
<td>.18</td>
<td>.1850</td>
</tr>
<tr>
<td>Sleep Hour</td>
<td>.25</td>
<td>.0635</td>
</tr>
<tr>
<td>Age at Onset of NIDDM</td>
<td>.32</td>
<td>.0166*</td>
</tr>
<tr>
<td>Duration of NIDDM</td>
<td>-.27</td>
<td>.0392*</td>
</tr>
<tr>
<td>Education Level</td>
<td>.13</td>
<td>.3464</td>
</tr>
</tbody>
</table>

* Significant, $p < .05$
In addition, the analysis of variance revealed mean levels of HDSC were significantly different among subjects who received different sources of support ($p = .0456, R^2 = 19\%$). Therefore, Hypothesis 3 was supported.

**Hypothesis 4:** Health-deviation self-care directly and positively affects health. Although the relationship between health and health-deviation self-care was not as strong as the one between health and universal self-care, results of Pearson product moment correlations revealed a positive correlation between health-deviation self-care and health (Table 12). Therefore, Hypothesis 4 was supported.

**Additional Analyses**

Additional analyses were carried out as reported by Frey and Denyes in order to compare their findings with the present study. Present age of subjects, age at onset of diabetes, support system, sleep hour, diet, and HDSC variables were analyzed by step-wise regression in this study to determine their contribution to health. These significant predictors of health, 39\% of the variance, were the source of support and age, rather than HDSC.

To examine the influence of HDSC on the control of pathology, blood glucose levels and HDSC scores were computed. HDSC was significantly correlated with blood
glucose ($r = -.56$, $p = .0001$). The HDSC was inversely related to the level of blood glucose.

Finally, a scatter plot of the DSCPI scores and DISCPI scores revealed the positive relationship between USC and HDSC. Analysis of Variance revealed that USC can explain 26% of the variance in HDSC.
CHAPTER V

DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

Meaning of Findings Pertaining to Orem's Theory

Each hypothesis will be discussed in relation to Orem's theory of self-care:

**Hypothesis 1:** Basic conditioning factors (BCF) influence universal self-care actions. Orem (1991) defined basic conditioning factors as internal or external factors that affect an individual's ability to engage in self-care such as health, social support, duration of disease, education level, marital status, physical activity, blood glucose level, sleep hours, environment, employment, caloric intake, race, and age.

In this study, health, age, sleep hour, and onset of diabetes were positively correlated with USC, while length of diabetes was negatively correlated with USC. The subjects who received support from family plus friend(s) had significantly higher USC scores than subjects who had no support (Table 10). Results also demonstrated a significant difference in USC between some of the groups of subjects with different living arrangements (Table 11). Therefore, the results of this study support Orem's theory of self-care regarding to the
relationship between basic conditioning factors and universal self-care behaviors.

Hypothesis 2: Universal self-care directly and positively affects health. Orem (1991) conceptualizes health as having anatomic, physiologic, and psychological features. USC affects the outcome of self-care, health. Results revealed that USC accounted for 76% of the variance in health. Therefore, this study supports Orem's interconcept operation; universal self-care behaviors affect health state.

Hypothesis 3: BCF influence health deviation self-care. Although HDSC was positively correlated with the age at onset of diabetes, HDSC was negatively correlated with duration of diabetes. This finding suggests that subjects with later onset of diabetes had better health. In contrast, subjects with longer duration of diabetes had worse health.

Hypothesis 4: Health deviation self-care directly and positively affects health. The health state can explain 16% of variance in the HDSC while the health state plus duration of diabetes explains 26% of variance in the HDSC. However, only the support system entered at .05 significance level when onset and support system (family plus friend versus none) were added into a
stepwise multiple regression as dummy variables. Variance in the support system accounts for 16% of the variance in the HDSC. By supporting the diabetic, the helpers encourage the performance of health-deviation self-care (Orem, 1991); the disease itself involves structural and functional changes which may limit person's ability of self-care.

Comparison to Other Investigations

National statistics in 1990 reported 57% of diabetics were females and 43% were males (American Diabetes Association, 1993). This study sample consisted of 55% females and 45% males. Five respondents did not complete DSCPI or DHSI. Although Denyes (personal communication) indicated subjects in her study experienced no difficulties completing the DSCPI, some subjects in this study commented on the questionnaires, "It is very hard to assign numerical values to questions such as the ones on this page" [the DSCPI]. The subjects in this study ranged from age 30 to 85. The reading ability and thinking process of these adults undoubtedly differed from the adolescents in the Frey and Denyes (1989) study.

What do the findings of this study mean in relation to Frey and Denyes' study? This study indicated a
moderately strong positive linear relationship between USC and HDSC ($r = .52$, $p = .0001$) as did the Frey & Denyes (1989) study. This study indicated that sleep hour, age, onset, and source of support were positively correlated with universal self-care. On the other hand, onset and duration of diabetes and support of family plus friend were significantly correlated with health-deviation self-care. However, Frey and Denyes did not include support and sleep hour as BCF in their study. Both studies found a difference between universal self-care and health-deviation self-care. The adults in this study who reported performing higher levels of HDSC also reported better metabolic control, consistent with their findings in adolescent subjects with IDDM.

Age was positively correlated with USC, indicating that the older adults reported higher levels of USC than did adolescents. The positive relationship between USC and age opposed the finding in Frey and Denyes' study for the IDDM. The onset of diabetes mellitus also correlated significantly with USC. In addition to the current age of the subjects and the age at the onset of diabetes, health significantly correlated with USC, consistent with Dr. Frey and Dr. Denyes' findings.
Frey and Denyes (1989) found no significant correlation between HSDC and basic conditioning factors. However, in this study, age was positively correlated with HDSC. The subjects' health was also positively correlated with the HDSC. The difference in design between this study and Frey and Denyes was that health instead of health symptoms was used as one of the basic conditioning factors.

Frey and Denyes (1989) used health symptoms or the number of symptoms and the intensity of distress. In contrast, the DHSI in this study measured subjects' perceived general state of health as well as specific dimensions of health (e.g. nutrition status), consistent with Orem's (1991) description of health as the state of wholeness or integrity of human beings. She says, "Health is a state of physical, mental, and social well-being and not merely the absence of disease or infirmity" (p. 236) and conceptualized health states as having anatomic, physiologic, and psychological features. Her third set of basic conditioning factors included the factors of health state and the health care system.

In this study, when testing the hypothesis that self-care has a direct and positive effect on health, HDSC accounted for 16% of the variance in the health.
Frey and Denyes (1989) did not find a significant correlation between health and HDSC.

The results of this study highlight the need to assess Type II diabetics' perception of health, their universal self-care behaviors, and their support system. Findings indicate suggestions for both nursing education and practice. The source of support showed the value of enhancing health-deviation self-care behaviors. Assessing Type II diabetics for source of support could help to identify those in need of assistance before the onset of long-term complications. Nurses need to accurately assess the Type II diabetic's perception of their health and universal self-care behaviors which may vary from individual to individual. Nurses must understand the diabetic's basic conditioning factors, their perception of health, and their universal self-care behaviors to promote prevention of long-term complications and/or to restore integrity of life.

In summary, this study examined the relationship between universal self-care behaviors of adults with Type II diabetes mellitus and the basic conditioning factors; between health-deviation self-care behaviors and the basic conditioning factors; between universal self-care
behaviors and health; and between health-deviation self-care behaviors and health.

Findings from this study (Figure 1) indicate that the relationships among Orem's concepts are more complex than those proposed by Frey and Denyes (1989).

Figure 1. Proposed relationships among Orem's concepts for non-insulin-dependent diabetics.

Orem indicated health as one of the basic conditioning factors as well as the outcome of self-care behavior. As the outcome of self-care, 76% of the variance in health can be explained by the variance in the universal self-care, but not by the health-deviation
self-care. A possible explanation is that universal self-care gives positive feedback to health.

In other words, individuals with higher universal self-care behavior scores reported better outcome of self-care. In return, this outcome of universal self-care became an internal factor to facilitate the performance of self-care. Therefore in the Figure 1, health exists both as a basic conditioning factor as well as an outcome of self-care. In addition, the influence of universal self-care on the outcome of health was reinforced by the support of family plus friends.

Sleep hour, age, age at onset of diabetes, and source of support were positively correlated with universal self-care. On the other hand, onset and duration of diabetes and support of family plus friend were significantly correlated with health-deviation self-care thereby indicating a difference between universal self-care and health-deviation self-care, further reinforcing Frey and Denyes (1989) findings.

Recommendations

Although the sample size (57) of this study was 1.5 times the subjects in the Frey and Denyes (1989) study, recommendations include increasing the number of subjects with Type II diabetes mellitus and studying subjects in
other geographic areas and subjects of other cultural and ethnic groups.

This study poses the following additional questions:

What is the source of persons (e.g. families, friends, members of diabetic associations) perceived as helpful?

What is the ideal number of persons perceived as helpful to maximize benefit to the diabetic?

What could persons perceived as not helpful do to be perceived as helpful?

Does one's culture and/or ethnicity influence expectations of self-care and the importance of helpful persons?

What are the relationships among sleep, age, self-care, and metabolic control?

What is the effect of duration of diabetes mellitus with regard to metabolic control in persons with NIDDM?

This information would potentially guide a number of aspects of educational programs for persons with NIDDM and their families or significant others. Further, educational programs could be scheduled at appropriate intervals following the diagnosis of diabetes mellitus and potentially prevent or delay physiological complications. Meleis (1990) has alluded to the problem
of health being considered as both a cause and a consequence, similar to the findings of this study. This presents a theoretical problem; health needs to be clarified as either a BCF or as an outcome. Some studies (Baker, 1991; Denyes, 1988) define health as an outcome; others (Baldwin & Schaffer, 1990; Fuller, 1992) as a BCF. If this theoretical problem is not clarified, findings will continue to be confounded.

Morales and Jiang (1993) indicated cross-cultural applicability of Orem's conceptual framework. The subjects in this study were almost exclusively Caucasian. Similar studies need to be conducted to investigate similarities and differences between cultures with regard to self-care, perceptions of health, support systems, and other basic conditioning factors.

Conclusions

In summary, results of this study support Orem's theory of self-care regarding the relationship between BCF and health-deviation self-care. The significant correlation between HDSC and blood glucose indicated that adults who reported performing higher levels of HDSC also reported lower levels of blood glucose. Overall, HDSC accounted for 31% of the variance in metabolic control. Although Orem did not address the influence of HDSC on
the outcome of self-care, the results of this study revealed that HDSC affects the outcome of self-care in terms of metabolic control. The findings of this study provide clarification of Orem's theory of self-care and empirical support for relationships among universal and health-deviation self-care and other concepts in the theory. This study has verified and expanded Frey and Denyes' study (1989).
REFERENCES


APPENDIXES
APPENDIX I

Packet for Respondents to Self-Care Survey

of

Persons with Type II Diabetes

Chen-Yen Wang, BSN, RN
Explanation of Study

Dear Respondent:

Thank you for your interest in participating in this study to examine how persons with diabetes mellitus who take oral medication, not insulin, control their blood glucose. I am a Master's student and am conducting this study for my thesis. The findings of this study will provide nurses and other health care providers with information to establish effective treatment for persons with diabetes who do not take insulin. Your participation in this study requires the completion of the enclosed questionnaires which will require 10 to 15 minutes.

This study involves no risk to you; no experimental procedures are involved. There will be no direct benefit to you. Potential benefits to you and other persons who use oral medication to control their blood sugar includes the development of more effective treatments.

Your participation is voluntary. You may withdraw your participation at anytime without penalty. Please sign the enclosed statement as your consent to participate and return it and the completed questionnaires to me.

Confidentiality of your participation will be maintained. All findings will be reported as group findings; no individuals will be identified. Coded envelopes and the code list will be stored in the College of Nursing, Room 323, a locked room designated for the storage of materials related to research conducted by nursing faculty and students. Only my faculty advisor for this study, Dr. Fenske, and I will be able to access the records. Unidentified data will also be shared with Dr. Denyes who developed the questionnaire. If you have any questions about this study and/or your rights, please contact me.

Thank you for your participation.

Sincerely yours,

Chen Wang, BSN, RN
CONSENT TO PARTICIPATE

I have read and understand the explanation of the study of persons with diabetes who take oral medication, not insulin, to control their blood glucose. I understand that there is no direct benefit to me. I voluntarily agree to participate under the conditions described in the explanation of the study.

I understand that I can withdraw my participation at any time without penalty by notifying Ms. Wang at (615) 974-7625.

Signature: ________________________________

Date: ________________________________

Address: ________________________________

Please enclose this form and the questionnaires and return to me in the pre-addressed stamped envelope.

Thank you for your participation.
CONSENT TO PARTICIPATE

I have read and understand the explanation of the study of persons with diabetes who take oral medication, not insulin, to control their blood glucose. I understand that there is no direct benefit to me. I voluntarily agree to participate under the conditions described in the explanation of the study.

I understand that I can withdraw my participation at any time without penalty by notifying Ms. Wang at (615) 974-7625.

Signature: __________________________________________
Date: ________________________________________________
Address: ____________________________________________

Please keep this copy for yourself.
Thank you for your participation.
QUESTIONNAIRE

GENERAL HEALTH & DIABETES SELF-CARE
(Modified from Diabetic Self-Care Practice Instrument with Dr. Frey's permission)

INSTRUCTIONS
A. Please answer the questions by circling the number that best answers the question for you.
B. There are no right or wrong answers. Some questions may seem alike. Please answer all the questions.
C. You may write comments or explain your answers next to the questions.
D. In questions about your health, health means whatever health means to you.

THINGS YOU DO FOR YOUR DIABETES

<table>
<thead>
<tr>
<th>How often do you</th>
<th>Always</th>
<th>More than 1/2 of the time</th>
<th>About 1/2 of the time</th>
<th>Less than 1/2 of the time</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. eat the foods that are on your meal plan?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. eat the number of meals on your meal plan?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. eat meals at the right times during the day?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. eat the number of snacks on your meal plan?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>More than 1/2 of the time</td>
<td>About 1/2 of the time</td>
<td>Less than 1/2 of the time</td>
<td>Never</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>----------------------------</td>
<td>-----------------------</td>
<td>---------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>5. eat snacks at the right times during the day?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. wear Medic-Alert identification?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. carry a sugar source to treat reactions?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. take your own diabetic medication?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. have another person around to assist you in taking your diabetic medication?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. take your diabetic medication at about the same time every day?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>11. wear soft socks and shoes that fit?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12. weekly examine your shoes for cracks, pebbles, nails, and other irregularities which may irritate the skin?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>13. daily check feet for sores, changes in color, temperature, or signs of infection?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Question</td>
<td>Always</td>
<td>More than 1/2 of the time</td>
<td>About 1/2 of the time</td>
<td>Less than 1/2 of the time</td>
<td>Never</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------</td>
<td>---------------------------</td>
<td>-----------------------</td>
<td>---------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>14. get the exercise you need for diabetes?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15. do the number of blood glucose tests you are supposed to do?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>16. record the results of your blood glucose tests in a logbook?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>17. have another person help you check the results of your blood glucose tests?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>18. know when you have low blood sugar?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>19. eat something to bring your blood sugar up when you have low blood sugar?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>20. know when you have high blood sugar?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>21. do the kind of things that you need to do to bring your blood sugar down?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>22. do your own diabetic care?</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
DEMOGRAPHY:

Your age: ____________

Race: _____ Black  
_____ Oriental  
_____ White  
_____ Other (specify)

Education:  
_____ Grade school  
_____ High school graduate  
_____ Some high school  
_____ College graduate  
_____ Some college

Employment outside the home:  
_____ Full-time  
_____ Part-time  
_____ Retired

Marital status:  
_____ Married  
_____ Never married  
_____ Divorced  
_____ Separated  
_____ Widow/widower

How many calories are you to eat each day?  
_____ ADA 1000  
_____ ADA 1200  
_____ ADA 1600  
_____ ADA 1800  
_____ ADA 2000  
_____ Don't know  
_____ Other

Living arrangement:  
_____ live alone  
_____ live with someone who is helpful  
_____ live with someone who is not helpful  
_____ live with someone who is too helpful
What is your daily physical activity? (may check more than one)

___ house cleaning
___ walk one mile a day
___ cycling
___ other
___ (specify) __________________________________________

How many hours do you sleep each night? ________

Social support: (may check more than one)
___ receive family support
___ desire family support
___ receive friends' support
___ desire friends' support
___ receive diabetes-specific social support
___ desire diabetes-specific social support

How long have you had diabetes: ________ year(s)

Range of blood glucose levels before you eat
___ lower than 80
___ between 80 and 140
___ between 141 and 200
___ greater than 200

Note: DSCPI-90 and DHSI-90 are not included in this appendix due to copyright.
June 6, 1994

Chen-Yen Wang  
3500 Sutherland Ave. Apt. H 113  
Knoxville, TN 37919

Dear Ms. Wang,

I have enclosed a copy of the instruments you requested. The instruments have been combined into one questionnaire—Denyes Health Status Instrument (DHSI) (Items 38-47), Denyes Self-Care Practice Instrument (DSCPI) (Items 1-16), and Diabetic Self-Care Practice Instrument (DiSCPI) (Items 17-37).

You will need permission from Dr. Mary Denyes, the developer, for the DHSI and DSCPI. Her address is 3777 Greenook, Ann Arbor, MI 48103 and her work phone number is 313-577-4377. You should also ask her for copies of the scales since I modified them (deleting some items) for my use in 1988.

I am very pleased to give you permission to modify the DiSCPI for use with adults with NIDDM. I am unfamiliar with the management of NIDDM, but believe the approach to measurement would be very useful for that population.

Good luck with your study. Please give my regards to Dr. Alligood.

Sincerely,  

Maureen A. Frey, PhD, RN  
Assistant Professor/Assistant Research Scientist

maf/dlb  
Enclosure  
B:17CHEN
August 9, 1994

Chen-Yen Wang
3500 Sutherland Ave. Apt H113
Knoxville, TN 37919

Dear Ms. Wang:

I was pleased to receive your recent inquiries about the potential of replicating the study Dr. Frey and I conducted entitled "Health and illness self-care in adolescents with IDDM: A test of Orem's theory". As I understand it, you are interested in doing the replication with adults as part of your graduate studies at the University of Tennessee at Knoxville. The original self-care practice and health status instruments you requested, the Denyes Self-Care Practice Instrument (DSCPI-90) and the Denyes Health Status Instrument (DHSI-90), copies of scoring instructions, and a summary of reliability and validity data are enclosed.

The information in the following paragraph is what I usually send along to persons requesting to use my instruments. I am willing to grant you permission to use the instruments, but am a little concerned about the nature of modification you plan. I would appreciate knowing what kind of modification you believe to be necessary. They have been used with adults in their current form and/or with very little modification so I am unsure just what modification might be necessary for your work. Should you believe modification necessary, perhaps you could fax that to me to expedite your access to me (fax=313-426-4842). Should you decide they do not need modification, please feel free to use them keeping in mind the following requests.

As I hold the copyright for the instruments you are requesting to use, and am continuing with the development and use of them, I will make several requests of you in return for sharing the instruments with you. First, I would ask that prior to using them beyond this current study or sharing them with others, that you discuss with me any plans you have for their use. I would appreciate an update on your current study plans in a brief note--or copy of research questions, title of study, or proposal materials--anything you feel comfortable sharing as you go along. Secondly, I would ask that you be attentive to including the copyright information on any instrument copies you use. Finally, I would ask that you share with me data that you obtain from use of the instruments. I am in the continuing process of compiling aggregate data files that will enable me to further strengthen the reliability and validity support for the instruments, and would
appreciate your assistance with this. I would not use those data without clearly crediting your work, and would request only those data from my instruments and any accompanying demographics that may assist in comparing them with other sample data. I would, of course, be very interested and pleased to receive copies of any reports/papers you prepare in which your work with the instruments are described. However, the major piece that I am requesting is that the actual raw data from the instruments (and accompanying demographics) be made available to me. I am less concerned about the form in which I receive them than that I get the actual item scores and demographics, not just total scores. I am both eager to be supportive of your work, and cognizant of concerns people may have about "sharing" data, thus, if you have any concerns or questions about the instrument or about my requests, I would be happy to discuss them further with you.

I am sorry you have had difficulty reaching me. As it is summer I am not regularly in the office and I am going on sabbatical shortly I am not readily reachable. I believe if you use the phone number/fax number above (they are the same) that reaches my home you may be more successful in locating me should you have questions in the future. Good luck as you move forward with your work.

Sincerely yours,

Mary J. Denyes, PhD, RN, FAAN
Associate Professor
Family, Community, and Mental Health Nursing

ENC
VITA

Chen-Yen Wang was born in Taiwan, Republic of China, on April 5, 1954. She graduated from the University of Chinese Culture in June of 1976 with a Bachelor of Science, and in June of 1978 with a Master of Science in Horticulture.

In July of 1978 she was employed by Dr. Shang-Shyung Yang to work in the Department of Agricultural Chemistry of the National Taiwan University. In one project she carried out various physical and chemical studies of red algae, while in a second project she helped select and characterize several yeast fermentation mutants.

In September of 1982, Ms. Wang enrolled at the University of Tennessee, Knoxville. In March of 1984, she received the degree of Master of Science in Biochemistry. In March of 1984, Ms. Wang was accepted to the doctoral program in biochemistry and in March, 1987 received the Doctor of Philosophy degree.

In December of 1986, she was employed by Dr. Wen-Kung Yang to work in the Department of Biology of the Oak Ridge National Laboratory. She helped select oncogenes. In August of 1988, she was employed by Dr. Koontz to work in the Department of Biochemistry of The University of
Tennessee, Knoxville. She constructed a 26-base fragment in front of the insulin gene to enhance its expression.

In September of 1990, Ms. Wang enrolled in The University of Tennessee, Knoxville, College of Nursing. She received a Bachelor of Science in Nursing in May of 1992. In January of 1993, Ms. Wang was accepted to the Master's program and in May, 1995 received the Master of Science in Nursing.

Since May of 1992, Ms. Wang has been a staff nurse at the Baptist Hospital of East Tennessee.