Do Hardiness And Attitude Promote Self-care Adherence To Physical Activity Among Adults With Diabetes

R Navuluri

Citation

R Navuluri. *Do Hardiness And Attitude Promote Self-care Adherence To Physical Activity Among Adults With Diabetes*. The Internet Journal of Internal Medicine. 2000 Volume 3 Number 1.

Abstract

A descriptive correlational study was conducted to determine the relationship between health-related hardiness (HRH), patient attitude toward compliance (PAC), and self-care adherence to physical activity (SCA) among adults (N=155) with diabetes. Data were obtained through individual questionnaires mailed to the subjects identified from local hospital database. Theory of Reasoned Action and Orem's Self-Care Theory were integrated to guide the study. HRH was significantly positively correlated with SCA. The correlation between commitment/challenge part of HRH and SCA was significant and positive, while that between control and SCA was not. The variation in SCA due to control (1.4%), and commitment/challenge (7.7%) together was 9.1% compared to 5.2% due to unified HRH. Separating the HRH into its sub-components of control, and commitment/challenge may explain the individual differences in SCA better than the unified HRH characteristic. Individuals with higher commitment/challenge characteristic may adhere to health professionals' recommendations more than those with higher control characteristic. Those with higher control characteristic may follow self-management strategies other than exercise to control diabetes.

INTRODUCTION

Physical activity or exercise is a cornerstone in the management of diabetes, a stressful chronic disease. Exercise conveys many benefits such as lowering blood sugar levels, decreasing obesity, increasing insulin sensitivity, reducing macrovascular and microvascular complications, reducing hypertension, reducing lipid levels, and thus eventually leading to reduced morbidity and mortality due to diabetes (Colberg & Swain, 2000). Physical activity is a self-care behavior meaning that it is initiated by individuals on their own toward well-being (Orem, 1991). Adherence to exercise, which refers to the extent to which a person's behavior coincides with medical or health advice (Haynes, Taylor, & Sackett, 1979), requires challenging lifestyle changes for even the most disciplined individuals (Callahan & Williams, 1994).

Several variables such as knowledge, beliefs, attitudes, self-efficacy, and problem-solving capabilities influence health behaviors associated with lifestyle change (Whittemore, 2000). Additionally, individuals differ in the perception of a stressful event, and the way a person appraises an encounter determines how that person will cope with such stress (Lazarus & Folkman, 1984). Kobasa (1982) suggested that the personality resource of hardiness may have a direct effect on a person's ability to cope with stress. Later, Pollock (1984) developed the concept of health-related hardiness while studying the adaptation response of individuals to chronic illensses such as diabetes mellitus, hypertension, and rheumatoid arthritis. Health-related hardiness is a personality resource comprising of (a) the commitment dimension, which represents the appraisal and coping strategies an individual used in adaptation to chronic illness; (b) the control dimension, which represents the use of ego resources necessary to appraise, interpret, and respond to health stressors; and (c) the challenge domain, which represents the reappraisal of the health stressors as potentially beneficial or rewarding rather than threatening or harmful (Pollock, 1986).

According to the Theory of Reasoned Action (Ajzen & Fishbein, 1980), the immediate determinant of active self-care is intention, which is determined by attitude to and social norm on self-care. Attitudes are beliefs and opinions that predispose individuals to behave in certain ways (Allen & Santrock, 1993). Patient attitude toward compliance is the patient's level of agreement with doing what he/she is told to do by healthcare professionals (Fitgerald, Anderson, & Davis, 1995). It is hypothesized that if hardiness has a direct effect on a person's ability to cope with stress, and if attitude

could determine self-care behavior, both hardiness and attitude could have a positive relationship to self-care adherence to exercise among adults with diabetes, which is a stressful disease. Hence, a study was conducted to examine this hypothesis. Adherence and compliance are used interchangeably in this study as done by others before (Strauss, 1996; Becker & Janz, 1985). The study results would contribute to addition of information to clinical databases related to diabetes self-management. Analysis of behavioral, attitudinal, and physiologic data from clinical databases could help nurses including advanced practice nurses differentiate the type of interventions that are effective for a particular issue or person at different points in the disease trajectory (Whittemore, 2000).

THEORETICAL FRAMEWORK

Orem's Self-care Theory (Nicholas, 1989; Orem, 1991), and the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (Anderson, Fitzgerald, & Oh, 1993; Ajzen & Fishbein, 1980; De Weerdt et al., 1990) were integrated to serve as the framework for the study. The TRA states that the best predictor of a patient's behavior is the patient's intention to behave in a certain way. A person's intention is a function of attitudes, and social norms. In the TRA, attitudes are a function of beliefs. A person who believes that performing a given behavior will lead to positive outcomes will hold a favorable attitude toward performing the behavior. Thus, if an individual believes that he/she should what was told by the healthcare professional regarding exercise to manage diabetes will adhere to the regimen as opposed to the one who does not believe so. Personality variables, such as knowledge, anxiety, locus of control, age, education, gender, influence one's interpretation of ones' environment and thus the belief one holds (Dee Weerdt et al., 1990; Ajzen & Fishbein 1980).

The Theory of Reasoned Action was used as a framework to study the relationship of diabetes related attitudes and patients' self-reported adherence (n=1202) to various self-management practices by Anderson, Fitzgerald, Gorenflo, and Oh (1993). They found positive relationships between the attitudes and self-care adherence. Pender & Pender (1986) used the TRA as a framework to study the relationships among attitudes, subjective norms, and intentions to exercise regularly, maintain or attain recommended weight, and avoid highly stressful life situations in 377 adults. Their study results showed that the attitudes were useful in explaining the intentions to exercise regularly, maintain or attain recommended weight, and avoid highly stressful situations.

According to Orem (1991), self-care is the practice of activities that individuals initiate and perform to maintain life or to improve health. Individuals' ability to meet their care needs to maintain life or to improve health is referred to as self-care agency. Orem's concept of self-care agency and hardiness have similarities and overlapping characteristics (Nicholas, 1989). The ability for engaging in self-care, can be affected by genetic and constitutional factors as well as by culture, life experiences, and health state (Orem, 1991). Similarly, hardiness can be influenced by the individual's capacities, skills, knowledge, genetic and constitutional factors, culture, life experiences, and health status. In addition, both self-care and the hardiness characteristic develop as behavior patterns (Nicholas, 1989). Orem's self-care model was used by Nicholas (1989) as the theoretical framework to investigate the relationship among hardiness, self-care practices, and perceived health status in the elderly. Based on the premises that hardiness was related to health status, and that self-care practices were positively related to health status, the investigator hypothesized that hardiness would also be related to self-care practices. The study findings (n=72) supported that hardiness and self-care practices were highly correlated, with hardiness accounting for 46% of the variance in predicting self-care practices.

Since hardiness and self-care agency have similarities, and hardiness as a personality trait could be an external variable that could influence attitude, it is used as a link to integrate both the TRA and Orem's Self-care theory to guide this study. Hardiness could influence self-care behavior directly as stress response as well as through its influence as a personality trait on the belief an individual holds and behaves in a certain way.

LITERATURE REVIEW

Kobasa (1979) showed that high stress/slow illness executives had more hardiness, that is, had a stronger commitment to self, an attitude of vigorousness toward environment, a sense of meaningfulness, and an internal locus of control compared with high stress/high illness executives. Pollock (1986) studied physiologic and psychological adaptation to chronic illness among three equal sized groups (n=20 each group) of adults with insulin-dependent diabetes, rheumatoid arthritis, and essential hypertension. The findings suggested that the presence of hardiness characteristic was significantly correlated with

both physiologic and psychological adaptation in the diabetic group but not in others. Pollock (1989) investigated major variables that affect adaptive responses to insulin-dependent diabetes mellitus (n=30), and concluded that the presence of hardiness characteristic was related to better physiological adaptation as well as stress appraisal and coping strategies. Ross (1991) suggested that health-related hardiness in elderly individuals with diabetes (n=50) may predict compliance to a prescribed diabetic self-management regimen, with 36% of the variance in compliance score accounted for by total health-related hardiness score. Nicholas (1993) examined the relationship among hardiness, self-care practices, and perceived health status in older adults (n=72) aged 55-72 years of age, and suggested that hardiness and perceived health status were significantly correlated, and hardiness and self-care practices were important predictors of perceived health status.

In a survey of 1, 202 diabetics to measure diabetes-related attitudes, 77.7% agreed that they should do what they were told to do by healthcare professionals (Anderson, Donnelly, & Dedrick, 1990). Dee Weerdt et al. (1990) suggested that attitude was the most important determinant of active self-care among 558 insulin treated diabetic patients. Anderson, Fitzgerald, and Oh (1993) reported that patients with diabetes (n=1202) who had high adherence to exercise recommendations expressed stronger agreement on the patient attitude toward compliance compared to those who had low level of adherence to exercise. Swift, Armstrong, Beerman, and Pond-Smith (1995) examined the attitudes and beliefs about exercise among 83 persons with non-insulin dependent diabetes who had completed outpatient diabetes counseling. Their study revealed that diabetes control was most often selected as the reason for initiating exercise (51%), followed by weight management (14%), while the reasons for continuing exercise by the respondents were diabetes control (46%), and weight management (30%).

Thus, while variables of hardiness, and attitudes in relation to adaptation and agreements with health professionals' advice, perceived health status, self-care practices, were variously studied by different researchers, no previous studies specifically addressed the relationship between health-related hardiness, attitude toward compliance, and adherence to exercise among adults with diabetes.

METHOD

After obtaining the approval for the selection of the human subjects from the Institutional Review Board at the Texas Tech University Health Sciences Center, a list of 483 adults with diabetes with addresses was obtained from the database of the local hospital in South-eastern New Mexico, USA. The hospital is a 250 bed acute care facility. There were a total of 2, 478 adults with both diagnosed and undiagnosed diabetes in the county (New Mexico Department of Health, 1996). The investigator is associated with the facility and hence, for convenience, the hospital is chosen to obtain the sample for the study.

Responses from 50 subjects were considered adequate based on power analysis with an alpha of 0.05, effect size of 0.40, and a power of 0.80. By increasing the sample size to 116, the power could be enhanced to 0.99 keeping the effect size at 0.40 and alpha at 0.05. Alternatively, a sample of 126 could decrease the effect size to 0.25 with a power of 0.80 and alpha of 0.05 (Polit & Hungler, 1991).

To obtain the study responses from the desired number of subjects, questionnaires were mailed to 483 adults with diabetes, which included 111 in Spanish. The list of mailers consisted of 169 (35%) male subjects and 314 (65%) female subjects. The questionnaire consisted of a cover letter, demographic questionnaire, health-related hardiness instrument, attitude toward compliance scale, and self-care adherence scale. A total of 155 completed questionnaires were received (32% response rate), of which 52 were from men and 103 were from women. Additional 24 returned incomplete questionnaires were rejected.

The study design was descriptive correlational. Adults with either type 1 or type 2 diabetes, who were diagnosed with diabetes for at least six months were included. Individuals who had been diagnosed within six months were excluded, since they might not have had adequate opportunity to learn the self-care behaviors related to diabetes management. The cut off period of 6 months was chosen, for it was felt that by that time patients would have made at least two visits to their healthcare provider after the initial diagnosis of diabetes and would have received the instructions on exercise. Care is taken to exclude those subjects diagnosed with diabetes for less than 6 months, through informing the subjects in the mailing letter, and also while tabulating the data.

INSTRUMENTS

The Health-Related Hardiness Scale (HRHS), Diabetes Attitude Scale (DAS), and the Diabetes Care Profile (DCP) were used to collect the data in the study. The HRHS was used to measure the health-related hardiness. The HRH scale

was specifically developed to measure hardiness among individuals with chronic illness such as diabetes mellitus. A subscale of the DAS was used to measure the patient attitude toward compliance. A subscale of the DCP was used to measure the self-care adherence to physical activity. While the attitude scale measures the individual's level of agreement with the instructions given by health professionals to manage illness, the DCP scale takes into account if the individual was instructed by a health professional to exercise or not before measuring the level of adherence. It is important to take this aspect of instruction into consideration because the attitude scale measures the belief in such instruction.

The HRHS instrument was developed by Pollock (1984), and revised later (Pollock & Duffy, 1990). The DAS and DCP were developed by the Michigan Diabetes Research and Training Center (Anderson, Donnelly, & Dedrick, 1990; Fitzgerald et al., 1996). Additionally, these instruments were tested and validated before, were permitted to be used, and addressed the variables proposed to be studied in this study. The demographic data were collected using the biographic information questionnaire developed for the current study.

THE DEMOGRAPHIC QUESTIONNAIRE

The questionnaire was designed to collect individual's personal data, such as gender, age, ethnicity, schooling, employment, hours of work, when diagnosed with diabetes, if taking diabetes pills, insulin, or both.

The HRHS. The health-related hardiness measures a personality resource comprising of (a) the commitment dimension, which represents the appraisal and coping strategies an individual uses in adaptation to chronic illness; (b) the control dimension, which represents the use of ego resources necessary to appraise, interpret, and respond to health stressors; and (c) the challenge domain, which represents the reappraisal of the health stressors as potentially beneficial or rewarding rather than threatening or harmful (Pollock, 1986). Pollock's (1984) HRHS was first developed to measure the hardiness characteristic in the chronically ill. It consisted of 48 items on a 6-point Likert scale. After further refinement, a 34 item HRHS was constructed (Pollock & Duffy, 1990) on a 6-point Likert scale with 2 subscales, control, and commitment/challenge. Higher scores on the HRHS indicated greater hardiness. The scores on the control subscale (14 items) ranged from 14 to 84 with high scores indicating high control. On the commitment and challenge subscale (20 items), scores ranged from 20 to 120. To avoid response bias, each subscale contained items which must be reversed for analysis. The two factors, control and commitment/challenge, explained 32.1% of the initially extracted common variance. Internal consistencies for the 34-item HRHS were 0.87 and 0.91 for the control and commitment/challenge subscales, respectively. Test-retest reliability (N=150) for 6 months was 0.76 for the total HRHS, and 0.78, and 0.74 for the control and commitment and challenge subscales, respectively. The Cronbach's alpha reliabilities for the total health-related hardiness, control, and commitment/challenge were 0.90, 0.75, and 0.88 respectively, in the present study.

The DAS. The Diabetes Attitude Scale consists of 50 5-point Likert scale items (5=strongly agree to 1=strongly disagree). After a principal factor analysis and scree plot examination, 35 items were retained, which were grouped into 7 subscales: need for special training, patient compliance, seriousness of non-insulin dependent diabetes, blood glucose control and complications, impact of diabetes on patients' lives, patient autonomy, and team care. The subscale of patient attitude toward compliance was used in this study to measure the patient attitude toward compliance. Patient attitude toward compliance indicated the extent to which respondents supported the idea that patients should do what they were told by health professionals. The higher scores indicated the stronger patient agreement that patients should do what they were told to do by healthcare professionals and vice-versa. The internal consistency was greater than 0.60 for all the subscales, and was 0.67 for the subscale of patient attitude toward compliance selected for this study (Anderson et al., 1990). The Cronbach's alpha for the patient attitude toward compliance was 0.68., in the present study.

The DCP. A subscale of the DCP was used to measure the self-care adherence to physical activity in this study. Fitzgerald et al. (1996) determined the reliability and the validity of the DCP in 2 studies (n = 440, and n = 352) and concluded that the reliabilities of individual DCP subscales ranged from 0.60 to 0.95. The reliability for the subscale of physical activity was 0.60 (Fitzgerald et al.,1996). In addition to measuring the level of adherence at three levels – none, low, and high, this scale addresses the question whether an individual was instructed by a healthcare professional about physical activity, which needs to be taken into consideration since the other variable of patient attitude toward compliance measures the individual's level of

agreement in doing what was told to do by a healthcare professional. The Cronbach's alpha for the self-care adherence to physical activity was 0.71, in the present study.

STATISTICAL ANALYSES

Descriptive statistics were used to obtain a profile of the participants. The data on the responses to individual questions on hardiness, patient attitude toward compliance, and self-care adherence to physical activity were interval data. Pearson's product-moment correlation coefficient (r) was used to study the relationship between the variables. Simple regressions and multiple regression were also calculated. Simple correlation analysis provides two pieces of information about the data: the nature of the linear relationship between two variables, and the magnitude of such relationship. Simple linear regression provides a means to estimate the value of a dependent variable based on the value of an independent variable. Multiple regression analysis enables quantification of the relationship between several independent variables and a dependant variable. A 0.05 level of significance was used to make statistical inferences (Burns & Grove, 1997).

RESULTS

DEMOGRAPHICS

The total sample size (N) was 155, of whom 52 were male and 103 were female, thus constituting a male to female ratio of 1:2. The average age of the study subjects was 57.9 years with a standard deviation of 15.8 and a range of 20 to 89 years. According to ethnicity, whites constituted 62.6% of the sample, followed by Hispanics who constituted 27.7% of the sample. Blacks constituted 7.1% and Native Americans 2.6% of the sample. Sixty-three (40.6%) subjects reported less than 12 years of schooling, 46(29.7%) subjects reported 12 years of schooling, and 46(29.7%) subjects reported more than 12 years of schooling.

Sixty-five (41.9%) of the subjects reported taking insulin, 90 (58.1%) subjects reported taking oral hypoglycemics, and 16 (10.3%) subjects reported taking both insulin and oral hypoglycemics. Subjects reported having been diagnosed with diabetes 10.6 years ago on average with a range of 7 months to 45 years

CORRELATIONS AND SIMPLE REGRESSIONS

The Pearson's product-moment correlations (r) were calculated to determine the nature and the degree of linear relationships between: (a) health-related hardiness (HRH) and patient attitude toward compliance (PAC); (b) HRH and self-care adherence to physical activity (SCA); (c) PAC and SCA; (d) control and SCA; and (e) commitment/challenge and SCA. The r values, and the corresponding p values between these variables, and the variances were presented in Table 1.

Table 1: Pearson's product-moment correlation coefficients (r), p values, and variances (r^2) between health-related hardiness (HRH), subscales of HRH, patient attitutde toward compliance (PAC), and self-care adherence to physical activity (SCA)

*Statistically significant at 0.05 level

Regression analyses were performed to determine the functional relationships among these variables. The regression equations were presented in Table 2.

Table 2: Regression equations predicting the functional relationship between self-care adherence to physical activity (SCA) and the independent variables of health-related hardiness (HRH). control, commitment/challenge (comm), and patient attitude toward compliance (PAC)

* Statistically significant at 0.05 level

Those subjects (N= 23) who responded “no” to the first question in the self-care activity questionnaire indicating that they had not received advice about exercise from a doctor or a nurse were excluded from the analysis, since their adherence to exercise could not be ascertained if they did not receive any instructions.

Health-related hardiness and SCA were positively correlated, and the relationship between them (r = 0.227) was statistically significant at 0.05 level. Patient attitude toward compliance and SCA were positively correlated (r = 0.162), but not statistically significant at 0.05 level. The HRH and PAC were positively correlated (r = 0.103), but not statistically significant at 0.05 level. The correlation between control and SCA (r = 0.120) was positive, but not significant at 0.05 level, whereas the correlation between commitment/challenge and SCA (r = 0.278) was positive and significant at 0.05 level.

From the linear equations it was evident that the proportion of total variation in HRH accounted for by PAC was 1.10%, and SCA was 5.20%. The proportion of total variation in PAC accounted for by HRH was 1.10%, and SCA was 2.60%. The proportion of total variation in SCA accounted

for by HRH was 5.20%, and PAC was 2.60%. However, the proportion of total variation in SCA accounted for by Control was 1.4%, and Commitment/challenge was 7.7%. The variation SCA due to control, and commitment/challenge together was 9.1% compared to 5.2% provided by HRH as a unified variable.

MULTIPLE REGRESSIONS

Multiple regressions were calculated with HRH and PAC being independent variables (x_1 and x_2) and SCA as dependent variable (y). Additionally, a multiple regression between SCA as the dependent variable (y), and control, commitment/challenge, and PAC as independent variables (x_1, x_2, and x_3). These equations were presented in Table 3. The proportion of total variation in SCA accounted for by unified HRH, and PAC together was 7.14%., whereas it was 10.82% due to control, commitment/challenge, and PAC combined.

Table 3: Multiple regression equations between self-care adherence to physical activity (SCA) and the independent variables of health-related hardiness (HRH), control, commitment/challenge (comm), patient attitude toward compliance (PAC)

* Significant at 0.05 level

DISCUSSION

The correlation between HRH and SCA was positive and significant at 0.05 level. These findings were in agreement with Ross (1991), who reported a significant correlation between HRH and self-management compliance which included the regimens of medications, diet, exercise, urine and blood testing for glucose among a sample of 50 adults with type 2 diabetes. Similar findings were also reported by other researchers. Pollock (1986) reported that the presence of hardiness was significantly related to both physiological and psychological adaptation to diabetes (n = 20); McCrane, Lambert, and Lambert (1987) reported that hardiness had beneficial effects in reducing burnout among staff nurses (n = 107); and Magnani (1990) reported that activity levels were significantly correlated with hardiness among a group (n = 115) of independently functioning older adults aged 60-90 years. Similarly, significant correlations between hardiness and perceived health status, and between perceived health status and self-care practices were reported by Nicholas (1993) among older adults (n = 72) aged 55-92 years.

The correlation between control and SCA was not significant, but the correlation between commitment/challenge and SCA was significant at 0.05 level. This finding did not support Kobasa's (1979) hypothesis that among persons under stress, those who have greater sense of control over what occurs in their lives will remain healthier that will those who feel powerless. However, Kobasa's hypothesis could be supported if there are self-management strategies other than physical activity which could be used by those individuals with higher personality of control to effectively manage their diabetes than those with lesser personality of control. The control domain of HRH indicates the use of ego resources necessary to appraise, interpret, and respond to health stressors (Pollock, 1989). The control orientation supports individual decision making and personal control (Bigbee, 1985). Commitment and challenge indicate an appraisal and reappraisal of health-related activities appropriate for dealing with health stressors (Pollock, 1989). It could be likely that individuals with higher commitment/challenge characteristic than control might tend to strongly agree that they should do what they were told to do by the health-care professionals. The variation in PAC due to control was 0.2%, whereas it was 1.7% due to commitment/challenge. A question could be that if individuals possessing high control characteristic have strong ego to the extent of preventing them from believing that they should do what they were told to do by the health professionals. On the other hand individuals with high control characteristic may believe in following certain recommendations only but not all made by healthcare professionals. For example, they may believe in following recommendations such as medications, glucose testing, or diet, but not exercise. The DAS used in this study did not specify any such recommendations.

Jennings and Staggers (1994) in a critical analysis of hardiness reported that out of 12 studies which reported multiple regressions with composite hardiness scores, the variance attributed to hardiness ranged from 4% to 36%. Pollock (1989) reported that out of the 56% of variance in predicting physiological adaptation in individuals with insulin-dependent diabetes mellitus, HRH accounted for 11% of the variance. In the current study, HRH alone accounted for 5.2% of the variation in SCA, and PAC accounted for 2.6% of the variation in SCA. Combining both HRH and PAC in the multiple regression analysis did not increase the variance in SCA. In fact, the combined variance (7.1%) was lower than the individual variances due to HRH

and PAC added together (7.8%). Higher variation in SCA was accounted for by separating the HRH into control and commitment and challenge (9.1%) than keeping total HRH as a single unified variable (5.2%). The findings of this study supported the findings of Hull, Van Treuren, and Virnelli (1987) that hardiness may not be a unitary construct and that composite hardiness might obscure the effects of the subcomponents.

The correlation between PAC and SCA was positive, but non-significant at 0.05 level. Anderson, Fitzgerald, and Oh (1993) reported that patients who had high adherence to exercise recommendations expressed stronger agreement on the patient attitude toward compliance compared to those who had low level of adherence to exercise. In the present study, higher score on patient attitude toward compliance indicated the stronger agreement of the patients that they should do what they were told to do by the healthcare professionals to manage their diabetes than those with lower score. However, such an agreement was not a guarantee that they would comply with what they were told to do by the healthcare professionals.

LIMITATIONS

Even though positive relationships were determined between variables, especially between HRH and SCA, a cause and effect relationship between HRH and SCA cannot be inferred. The study utilized self-report data for diagnosis of diabetes and SCA. Such responses could be subject to cognitive distortion and defense mechanisms. Subjects could misinterpret the questions, misinterpret the scale in marking their responses, and could also supress, repress, or deny the truth for their own reasons.

IMPLICATIONS FOR NURSING

Based on the findings of this study, it may be recommended that health-related hardiness could be divided into its subcomponents of control, and commitment/challenge in future research studies involving hardiness. Additionally, the study findings did not support Kobasa's (1979) hypothesis that among persons under stress, those who have greater sense of control over what occurs in their lives will remain healthier than will those who feel powerless. Conversely, Kobasa's hypothesis could be supported if there are other self-management strategies other than physical activity which could be used by those individuals with higher sense of control to manage their diabetes effectively than those with lesser sense of control characteristic. Hence, future studies may address this area of different self-management strategies such as diet control and medication compliance in relation to control characteristic.

If patients strongly agree that they should do what they were told to do by healthcare professionals, and if they were told to exercise to manage their diabetes, why is it the correlation between such attitude and adherence to physical activity not significant? It is likely that there could be barriers that come in the way of an individual's attitude leading to adherence. Time pressures, competing priorities, social events, negative emotions, and difficulty resisting temptations have often been the most frequently cited barriers associated with life style change among individuals with diabetes (Estey, Tan, & May, 1990; Schlundt, Rea, Kline, & Prichert, 1994; Travis, 1997). Patients with a strong attitude toward compliance may not necessarily adhere to all the recommendations made by the healthcare professionals. Rather they may comply with one or the other intervention, and in this case could not have been exercise. Hence, researchers may look into the possibility of developing scales to measure attitude with reference to specific self-management behaviors. Additionally, innovative strategies aimed at overcoming personal barriers to diabetes self-management need to be explored (Clement, 1995).

Incorporation of behavioral strategies into regular clinic visits (Goodall & Halford, 1991), and implementation of strategies that emphasize patterns of behavior and simplified behavior change rather than overloading non-insulin dependant diabetes mellitus patients with intensive information (Brown, 1992) have been some suggested strategies to improve self-management of diabetes by individuals. Strauss (1996) observed that attempts to foster adherence to treatment are viewed as frustrating experience for patients and providers. He reasoned that instead of putting blame either on a non-compliant patients or an insensitive provider, the goal should be to find a common ground and capitalize on the strengths of both patient and provider.

Accordingly, efforts should be made by clinicians in include hardiness, attitudes, and barriers to self-care into their patient assessments so that effective individualized strategies for self-management of diabetes could be prescribed and promoted with due respect to patient autonomy and choice rather than blame patients for non-compliance. Similarly, community diabetes education programs could also incorporate personality and behavioral strategies including

hardiness, attitudes, and measures to overcome barriers to self-care in addition to emphasizing on diabetes knowledge.

Funnell, Anderson, and Oh (1994) examined if a patient education program "Life with diabetes" could be converted to an undergraduate course. Their study revealed that, (a) the one credit course measurably improved knowledge and attitudes among undergraduates who did not have diabetes, and (b) the course provided students who had diabetes with information and a forum to interact with diabetes experts. Similarly, college courses, and continuing education courses could be developed for nurses including advanced practice nurses, diabetes educators, and clinicians that include assessment tools and implementation strategies which aid in promoting health-related hardiness, patient attitudes, and self-care barriers identification and overcoming strategies.

CONCLUSION

The study revealed that HRH was significantly positively correlated with SCA among adults with diabetes, and that mere stronger agreement of patients that they should do what they were told to do by health-care professionals is not a guarantee in itself that they will adhere to SCA. Separating the HRH into its subcomponents of control, and commitment/challenge may explain the individual differences in SCA among adults with diabetes. With regard to attitude to compliance, specific scales to measure attitudes specific to individual self-care measures such as diet, medication, exercise, or glucose testing are needed to developed and studied. Development of innovative strategies to overcome barriers to self-management, and encouraging patients to comply with self-care regimens based on autonomy through mutual respect and trust between patient and provider are suggested.

CORRESPONDENCE TO

Ramesh Navuluri 4017 Cortez Hobbs, New Mexico 88240, USA Phone: 505-392-7482 (Home) 505-392-7537 (work) e-mail: RNavuluri@aol.com

ACKNOWLEDGMENTS

The author is highly grateful to the thesis committee chairperson Dr. Susan E. Pollock, RN, PhD, FAAN, and the members of the committee, Dr. Nancy Ridenour, RN, PhD, CS, FNC, FAAN, and Dr. Alwilda Scholler-Jaquish, RN, MN, MSN, PhD, for their direction, encouragement, and timely help during the conduct of this study.

The author also thanks Dr. Robert M. Anderson and Dr. James T. Fitzgerald at the Michigan Diabetes Research and Training Center for their permissions to use the instruments, Delrose Scott, Chief Nursing Officer at the Lea Regional Medical Center, Hobbs for the list of subjects for the study, all the study participants, and Douglas Hubbard, Director, TTUHSC Computer Services for his statistical expertise and assistance with data analysis. Additionally, all the help extended to him by friends and family members during the study is highly regarded with gratitude by the author.

References

r-0. Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice Hall.
r-1. Allen, L., & Santrock, J. W. (1993). Psychology: The contexts of behavior. Madison, WI: Brown & Benchmark.
r-2. Anderson, R. M., Donnelly, M. B., & Dedrick, R. F. (1990). Measuring the attitudes of patients towards diabetes and its treatment. Patient Education and Counseling, 16, 231-245.
r-3. Anderson, R. M., Fitzgerald, J. T., Gorenflo, D. W., & Oh, M. S. (1993). A comparision of the diabetes related attitudes of healthcare professionals and patients. Patient Education and Counseling, 21, 41-50.
r-4. Anderson, R. M., Fitzgerald, J. T., & Oh, M. S. (1993). The relationship between diabetes related attitudes and patients' self-reported adherence. Diabetes Educator, 19(4), 287-292.
r-5. Becker, M.H., & Janz, N. K.(1985). The health belief model applied to understanding diabetes regiment compliance. Diabetes Educator, 11, 41-47.
r-6. Bigbee, J. L. (1985). Hardiness: A new perspective in health promotion. Nurse Practitioner, 10 (11), 51-56.
r-7. Brown, S. A. (1992). Meta-analysis of diabetes patient education research: Variations in intervention effects across subjects. Research in Nursing and Health, 15, 409-419.
r-8. Burns, N., & Grove, S. K. (1997). The practice of nursing research: Conduct, critique, & utilization. Philadelphia: W. B. Sanders.
r-9. Callahan, D., & Williams, A. (1994). Living with diabetes: Issues for nursing practice. Journal of Advanced Nursing, 20, 132-139.
r-10. Clement, S. (1995). Diabetes self-management education. Diabetes Care, 18, 1204-1214.
r-11. Colberg, S. R., & Swain, D. P. (2000). Exercise and diabetes control – A winning combination. The Physician and Sports Medicine, 28 (4), 63-81.
r-12. De Weerdt, I. D., Visser, A. P., Kok, G., Van Der Veen, E. A. . (1990). Determinants of active self-care behavior of insulin treated patients with diabetes: Implications for diabetes education. Social Science and Medicine, 30, 605-615.
r-13. Estey, A.L., Tan, M.H., & Mann, K. (1990). Follow-up interventions: Its effect in compliance behavior to a diabetes regimen. Diabetes Educator, 16, 291-295.
r-14. Fitzgerald, J. F., Anderson, R. M., & Davis, W. K. (1995). Gender differences in diabetes attitudes and adherence. Diabetes Educator, 21, 523-529.
r-15. Fitzgerald, J. T., Davis, W. K., Connell, C. M., Hess, G. E., Funnell, M. M., & Hiss, R. G. (1996). Development and validation of the diabetes care profile. Evaluation and the Health Professions,19(2), 208-230.
r-16. Funnell, M. M., Anderson, R.M., & Oh, M. S. (1994).

Adapting a diabetes patient education program for use as a university course. Diabetes Educator, 20, 297-302.
r-17. Goodall, T. A., & Halford, W. K. (1991). Self-management of diabetes mellitus: A critical review. Health Psychology, 10, 1-8.
r-18. Haynes, R. B., taylor, D. W., & Sackett, D. L. (Eds.). (1979). Compliance in health care. Baltimore, MD: The john Hopkins University Press.
r-19. Hull, J. G., Van Treuren, R. R., & Virnelli, S. (1987). Hardiness and health: A critique and alternative approach. Journal of Personality and Social Psychology, 53, 518- 530.
r-20. Jennings, B. M., & Staggers, N. (1994). A critical analysis of hardiness. Nursing Research, 43 (5), 274-281.
r-21. Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. Journal of Personality and Social Psychology, 37, 1-11.
r-22. Lazarus, R. S., & Folkman, S. (1984). Stress: appraisal and coping. New York: Springer.
r-23. Magnani, L. E. (1990). Hardiness, self-perceived health, and activity among independently functioning older adults. Scholarly Inquiry for Nursing Practice: An International Journal 4, 171-188.
r-24. McCrane, E. W., Lambert, V. A., & Lambert Jr., C. E. (1987). Work stress, hardiness, and burnout among hospital staff nurses. Nursing Research, 36, 374 - 378.
r-25. New Mexico Department of Health. (1996). 1996 Lea County health profiles (a publication of Bureau of Vital records and Health statistics). Santa Fe, NM.
r-26. Nicholas, P. K. (1989). Hardiness, self-care practices, and perceived health status in the elderly. D. N. Sc. dissertation, Boston University School of Nursing.
r-27. Nicholas, P. K. (1993). Hardiness, self-care practices and perceived health status in older adults. Journal of Advanced Nursing, 18, 1085 – 1094.
r-28. Orem, D. E. (1991). Nursing: Concepts of practice. New York: McGraw-Hill.
r-29. Pender, N. J., & Pender, A. R. (1986). Attitudes, subjective norms, and intentions to engage in health behaviors. Nursing Research, 35 (1), 15-18.
r-30. Polit, D. F., & Hungler, B.P. (1991). Nursing research: Principles and methods. Philadelphia: J. B. Lippincott.
r-31. Pollock, S. E. (1984). Adaptation to stress. Texas Nursing, 58, 12-13.
r-32. Pollock, S. E. (1986). Human responses to chronic illness: Physiologic and
r-33. psychosocial adaptation. Nursing Research, 35, 90-95.
r-34. Pollock, S. E. (1989). The hardiness characteristic: A motivating factor in adaptation. Advances in Nursing Science, 11 (2), 53-62.
r-35. Pollock, S. E., & Duffy, M. E. (1990). The health-related hardiness scale: Development and psychometric analysis. Nursing Research, 39, 218-222.
r-36. Ross, M. E. T. (1991). Hardiness and compliance in elderly patients with diabetes. Diabetes Educator, 17, 372 –375.
r-37. Schlundt, D. G., Rea, M. R., Kline, S. S., & Pichert, J. W. (1994). Situational obstacles to dietary adherence for adults with diabetes. Journal of American Diabetic Association, 94, 874-879.
r-38. Strauss, G. J. (1996). Psychological factors in intensive management of insulin-dependent diabetes mellitus. Nursing Clinics of North America, 31, 737 – 745.
r-39. Swift, C. S., Armstrong, J. E., Beerman, K. A., Campbell, R. K., Pond-Smith, D. (1995). Attitudes and beliefs about exercise among persons with non-insulin dependent diabetes. Diabetes Educator, 21, 533-540.
r-40. Travis, T. (1997). Patient perceptions of factors that affect adherence to dietary regimens for diabetes mellitus. Diabetes Educator, 23, 152-156.
r-41. Whittemore, R. (2000). Strategies to facilitate lifestyle change associated with diabetes mellitus. Journal of Nursing Scholarship, 32, 225 - 232.

Author Information

Ramesh B Navuluri, MSc (Agri), MSN, RN, CS, CNP
Nurse practitioner, Primary Care, Nursing, Lea Regional Medical Center