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Physical Activity, Obesity, Nutritional Health and Quality of Life in Low-Income Hispanic Adults with Diabetes

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Abstract

The study examined relationships among age, body mass index, physical activity, nutritional health, quality of life and health-related quality of life in Hispanic adults with diabetes (N =59) using the PRECEDE-PROCEED planning model as a framework. Data were collected through face-to-face interviews at clinics and communities. A regression model with predisposing factors (age, BMI), and behavior (nutritional health and physical activity) significantly predicted quality of life (R^2=0.21, F=3.63, p < .05) explaining 21% of variance. Physical activity and nutrition were the strongest predictors. Cultural competent intervention strategies must include factors that improve and enhance quality of life.

Introduction

Diabetes affects approximately 2.5 million Hispanic/Latino American adults, or 10.4% of the U.S. Hispanic population (Center for Disease Control and Prevention, [CDC] 2008a). Hispanic/Latino Americans are 1.7 times and Mexican Americans are twice as likely to develop diabetes as non-Hispanic whites (Office of Minority Health [OMH], 2008a). Diabetes is the fifth leading cause of death among Hispanics in the United States (CDC, 2005), with death rates 60% higher than those of non-Hispanic Whites in 2005. Of the 35 million Hispanics living in the United States, 10.4% have been diagnosed with diabetes compared to 6.6% of non-Hispanic whites (OMH, 2008b).

Factors contributing to the burden of diabetes among minority groups include the seriousness of diabetes, inadequate access to proper diabetes prevention and management programs, and inadequate quality of care. Also, individual factors such as improper nutrition, physical inactivity and obesity contribute to the high risk of diabetes in Hispanics (CDC, 2005). More Hispanics (31.1%) report fair or poor health than non-Hispanic whites (12.9%), and more Spanish-speaking Hispanics report poor or fair health status (39%) than English-speaking Hispanics (17%) (CDC, 2008b). Hispanics report physical health and mental health and activity limitations (DuBard & Gizlice, 2008). In addition, older Hispanics with diabetes reported poorer health-related quality of life (HRQOL) than individuals without diabetes (Graham et al., 2007).

In *Healthy People 2010* (U.S. Department of Health and Human Services [DHHS], 2000), quality of life (QOL) is an important indicator of health. Quality of life refers to a sense of well-being, happiness and satisfaction (DHHS, 2000). Health-related quality of life refers to an individuals' perception of physical and mental health status over time (CDC, 2009a). Much emphasis is being placed on improving quality and years of life and eliminating health

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disparities (DHHS, 2006). However, little is known about the role of physical activity, obesity and nutrition in quality of life and health-related quality of life among Hispanics with type 2 diabetes. Given the high prevalence of diabetes in the Hispanic population and its associated complications, research needs to focus on this ethnic group. Understanding diabetes and its related health factors are necessary to develop interventions and determine if Hispanics require different methods and strategies (Magwood et al., 2008; Garcia, 2008). Therefore, this study examined quality of life and health-related quality of life of Hispanics with Type 2 diabetes, and factors associated with quality of life and health-related quality of life.

The PRECEDE-PROCEED Planning Model was used as a framework for the study (Green & Kreuter, 2004). This model describes factors influencing health outcomes and provides a comprehensive structure for health needs assessment, program design, implementation and evaluation of health promotion programs. The PRECEDE phases include social, epidemiological, behavioral and environmental, educational and ecological, administrative and policy assessment. The model posits that predisposing, reinforcing and enabling factors have an effect on behavior and the environment; therefore through behavior and environment, predisposing, reinforcing and enabling factors have an impact on quality of life. Components of the model used in the current study were predisposing factors (age and body mass index [BMI]), behavioral factors (physical activity and nutritional health) and quality of life, measured with both generic and disease-specific instruments.

Quality of Life

Hispanic adults with diabetes have been found to have higher morbidity and mortality than non-Hispanic Whites. Hispanic adults have a higher prevalence of cardiovascular disease risk factors and diabetes complications than non-Hispanic Whites (OMH, 2008a), and these complications have a negative impact on quality of life (Lloyd, Sawyer, & Hopkinson, 2001). Graham and colleagues (2007) found that older Mexican Americans with diabetes had poor health-related quality of life in the domains of physical functioning, bodily pain, general health, social functioning, and role emotion. Hispanics with diabetes perceived lower quality of life due to dietary restrictions (Misra & Lager, 2009). However, studies of quality of life and health-related quality of life in Hispanics with diabetes are few.

Predisposing factors and quality of life

Older age has been associated with poorer health-related quality of life (Redekop et al., 2002). Older adults perceive greater role limitations due to physical problems, but report better social function in the mental component of health-related quality of life. Trief and colleagues (2003) found that age independently predicted quality of life. Older adults (≥ 65 years) with diabetes perceived a better quality of life than younger adults (30–64 years) with diabetes, reporting greater satisfaction with diabetes-related aspects of their lives and less emotional distress and better coping with diabetes.

Several studies have explored the impact of obesity on health-related quality of life. Authors reported that obesity was associated with impaired health-related quality of life (Damush, Stump, & Clark, 2002; Jia & Lubetkin, 2005; Rejeski et al., 2006). Individuals in the general adult US population who are overweight or obese and those with diabetes have significantly lower scores on health-related quality of life, particularly on physical health of health-related quality of life (Jia & Lubetkin, 2005; Rejeski et al., 2006). The physical health component of health-related quality of life decreases with increased BMI in overweight and obese adults with type 2 diabetes (Rejeski et al., 2006).

Behavioral factors and quality of life

Physical activity for 150 minutes each week is recommended by the CDC (2008c). The National Health Interview survey and the third National Health and Nutrition Examination Survey (NHANES III) (CDC, 2000) have found that Hispanics have lower levels of leisure-time activity than non-Hispanics (Neighbors, Marquez, & Marcus, 2008), and 40% of Mexican Americans report leisure time inactivity (Crespo, Smit, Andersen, Carter-Pokras, & Ainsworth, 2000). A large percentage of Mexican Americans with diabetes do not participate in any leisure time activity (Wood, 2004).

Physical activity has been associated with improved health-related quality of life (Brown et al., 2003; Li, Jiles, Ford, Giles & Mokdad, 2007; Wendel-Vos, Schuit, Tijhuis, & Kromhout, 2004). Studies have found that an association between leisure time physical activity and health-related quality of life (Brown et al., 2003; Wendel-Vos et al., 2004). Li and colleagues (2007) examined the relationship between healthy lifestyle habits, including non-smoking, leisure time physical activity and healthy eating in US adults with diabetes using national data from the 2005 Behavioral Risk Factor Surveillance Survey. Results indicate that healthy lifestyle habits were associated with health-related quality of life. Adults who were physically inactive reported poorer health-related quality of life than adults who were physically active. Performing the recommended levels of physical activity was associated with both better health-related quality of life and health outcomes, including improved mobility, decreased pain and higher emotional wellbeing (Brown et al., 2003; Sawatzky, Liu-Ambrose, Miller & Marra, 2007).

Physical function limitations can have a negative impact on quality of life (Polansky, 2000). Diabetics can suffer limitations due to vision difficulties, peripheral neuropathy, amputation, or heart disease (Huang et al., 2009). Quality of life has been reported lower in Hispanics with diabetes who have higher number of symptoms than in non-Hispanics with diabetes (Garcia, 2008) and in non-Hispanics without diabetes (Graham et al, 2007).

Many Hispanic Americans consume high amounts of carbohydrates and fat and do not meet recommend nutrient intake and dietary guidelines (Dixon et al., 2000; Glasgow et al., 2006; Wen et al., 2004). Keller, Osbye and Goy (2004) used the Determine Checklist to examine the relationship between nutritional health and quality of life and found that poorer nutritional health is a predictor of decreased quality of life in older adults. Though nutrition is an important indicator of quality of life and well-being in older adults (Drewnowski, & Evans, 2001; Thomas, 2001), few studies have examined the effects of nutritional health on health-related quality of life in Hispanics with diabetes.

Methods

A descriptive correlational design was used to examine the relationships among physical activity, obesity, nutritional health, quality of life and health-related quality of life in Hispanic adults with type 2 diabetes. Sociodemographic variables describe the sample.

Sample and setting

A convenience sample of 59 adult Hispanics with Type 2 diabetes was recruited from free/subsidized clinics, churches, and community centers in the southeastern U.S. Criteria for inclusion were a) self-identified ethnicity as Hispanic or Latino, b) medical diagnosis of type 2 diabetes on the clinical record, c) age 20 years or older, d) ability to speak English or Spanish, and e) oriented to time, place and person. A sample size of 53 would provide 80% power at an alpha level of 0.05 to detect a R^2 of .25 for four variables using multiple regression (nQuery Advisor Release 6.10, 2004).

Procedures

Participants were recruited at local Hispanic clinics, ethnic churches and the community Hispanic center by the staff and research assistants. Research team members were present during clinic times. Informed consent was obtained through bilingual research assistants prior to data collection. Data were collected via face to face interviews using trained interpreters, Spanish versions of questionnaires and standardized physiological equipment. Physiological data (BP, HbA1C, lipid profile, weight, height, and waist circumference) were collected by a registered nurse. It took approximately 30 minutes for a participant to complete the interview and assessment. At the completion of data collection, each participant received a $20.00 grocery store gift certificate as a measure of appreciation. The study was approved by the university Institutional Review Board.

Measurements

A demographic form was used to collect data on participants' age, gender, marital status, level of education, income, financial strain (ability to pay monthly bills), insurance status, country of origin, family history of diabetes and cardiovascular disease, smoking status and comorbidities. Smoking status was defined as whether current, former or never smoked and if current smoker, the number of cigarettes or cigars smoked per day and how long patient has been smoking (CDC, 1998). The presence of comorbidities was assessed by asking participants whether a physician had ever told them that they had heart disease, high blood pressure, kidney disease or stroke.

Blood pressure was measured following standardized blood pressure protocol guidelines of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (Chobanian et al., 2003). Participants were asked to sit quietly for at least 5 minutes in a chair before blood pressure was taken. Phase I and V Korotkoff' sounds were used to determine systolic and diastolic blood pressure readings (Chobanian et al., 2003). Participants who had blood pressure ≥130/85 mmHg or used antihypertensive medications were considered hypertensive.

Glycemic control was measured using the glycated hemoglobin A1C (HbA1C) blood test, which reflects glycemic control over the past 2–3 months. HbA1C was collected using finger stick blood by a registered nurse with a hemoglobin A1C machine (CA, USA). A1C > 7.0% is considered abnormal (American Diabetes Association, 2008).

Total cholesterol, high-density lipoproteins (HDL), low-density lipoproteins (LDL), triglycerides (TG) and non-fasting glucose were obtained through capillary finger stick. A portable analyzer and test cassette system (The Cholestech LDX machine) were used to analyze the lipid profile and glucose. The accuracy and precision of Cholestech LDX profiles are comparable to those obtained by reference methods used routinely in clinical diagnostic laboratories (Cholestech, 2005a, 2005b). Calibration of the Cholestech LDX machine with control cartridges was performed before the test to assure the accuracy of readings. Lipid values were considered abnormal if triglycerides were ≥ 150 mg/dL and HDL was < 40mg/dL in men, or < 50mg/dL in women (Grundy et al., 2005).

Height was measured with a stadiometer vertical board and an attached metric ruler and a horizontal headboard. Participants were instructed to stand on the base of the board with feet at a 60 degree angle and shoes off. Participants stood facing directly ahead with heels, buttocks, shoulder blades and back of head touching the vertical board. The head of the stadiometer was placed to the highest point of the head. Measurement was recorded to the nearest 1 millimeter just before exhalation (CDC, 2008d).

Weight was measured with an electronic weight scale. Participants were asked to stand completely still in the center of weight scale with feet close together and eyes looking straight forward. Weight was recorded in kilograms to 2 decimal points (CDC, 2008d).

Body mass index (BMI) was calculated by dividing subjects' weight (measured in kilograms) by the square of their height (measured in meters) (CDC, 2009b). A participant was categorized as overweight if body mass index was 25 to 29.9 kg/m^2 and obese if body mass index was 30 kg/m^2 or more (CDC, 2009b; National Institutes of Health & National Heart, Lung and Blood Institute, 1998).

Waist circumference was measured using the Gantt tape measure, by wrapping the tape at the top of the right iliac crest in a horizontal plane around the abdomen. This measure was taken after the participant exhaled without the tape compressing the skin. Measurements were recorded to the nearest 0.1cm (NIH, 1998). Participants were asked to remove any bulky belt, coat, or other clothing in order to measure the tape against the skin. A participant was categorized as high risk if waist circumference was greater than 40 inches (102cm) for men, and greater than 35 inches (88cm) for women (NIH, 1998).

Physical Activity was measured using the Exercise and Leisure-Time Physical Activity (LTPA) items from the National Health and Nutrition Examination Survey (CDC, 2000). Frequency and types of leisure time physical activity (> 3 times / week) were assessed. Each activity was coded Yes or No, then summed for the total number of LTPA which was used to determine whether persons met activity recommendations.

The 10-item Determine Your Nutritional Health Checklist as a behavior risk factor was used to assess dietary intake and meal patterns. A summed score of 0–2 indicates low nutritional risk, 3–5 moderate risks, and 6 or more high risk (Barrocas, White, Gomez, & Smithwick, 1996). Specificity and sensitivity were reported as 0.54 and 0.75, respectively (De Groot, Beck, Schroll, & van Staveren, 1998). The reliability and validity of the instrument have been established (Souter & Keller, 2000). While this instrument was originally developed for use with older adults, content validity for Hispanics and low-income persons from early adulthood to older adulthood was established by an expert panel of a doctorally prepared nurse practitioner who worked with low income populations, a master prepared public health nurse, a doctorally prepared maternal/child nurse, and a doctorally prepared adult health nurse who taught nutrition. Content validity index (CVI) is 1.0.

The Quality of Life Index-Diabetes Version (QLI) (Ferrans and Powers, 1985) Spanish version was used to measure disease specific quality of life. The QLI has two parts measurements of satisfaction with life and the importance of those aspects in four domains: health and functioning, psychological/spiritual, social and economic, and family (Ferrans, 1996; Ferrans & Powers, 1985). Each item is scored from 1 indicating "very dissatisfied" to 6 "very satisfied." Scores are calculated by weighting each item with its paired importance response. Summed scores range from 0–30 with higher scores indicating better quality of life. Reliability and validity have been established in the general population (Ferrans & Powers, 1992) and in adults with diabetes (DeSouza & Nairy, 2003).

The 12-item Medical Outcomes Study Short Form (SF-12) Health Survey was used to measure health-related quality of life (Ware, Kosinski, & Keller, 1996). The SF-12 consists of two major constructs: physical health and mental health, with eight health concepts: physical functioning, role limitations due to physical functioning, bodily pain, general health perceptions, role limitations due to emotional problems, vitality, general mental health, and social functioning. The SF-12 uses Likert scaling. Each subscale score is transformed from the normal scaling to a 0 to 100 standardized score, with higher scores representing more positive health and better health-related quality of life. The SF-12 has demonstrated good internal-consistency reliability,

with alpha coefficients on the components ranging from α =.72 to α =.89 (Parker, 2001; Resnick & Nahm, 2001), and it has been used with both genders, and multiple age and ethnic populations in a variety of settings. The SF-12 Spanish version was used in this study. The SF-12 Spanish version has been validated in Hispanics with type 2 diabetes (Brown et al, 2003; Huang et al, 2009). Cronbach's alphas for the SF-12 in the current study ranged .78 for mental health components to .82 for physical health components.

A bilingual translator translated the English version of the demographic form and the Determine Your Nutritional Health Checklist into Spanish, then a back translation was completed. Verification of translations, bilingual meaning error checks and content equivalence analysis were performed to ensure accurate language translation (Berry, 1993) and understanding at the appropriate level of education for participants who had low literacy skills.

Analysis

Descriptive statistics including frequencies, proportions, means and other measures of central tendency were used to characterize the sample. Hierarchical multiple regression was used to identify predictors of quality of life, and the physical and mental components of health-related quality of life in three separate models. To control for demographic variables, age was entered in the model in the first block and BMI, physical activity and nutritional health were entered in the second block of the model. The alpha level of significance was set at .05. SPSS 15.0 was used for the analyses.

Pearson's correlation coefficients were used to examine multicollinearity among variables prior to regression analyses. Coefficient alpha was calculated to assess reliability of tools with this sample.

Results

Demographic Characteristics

The mean age of participants was 49 years (±12.56), with a range from 23 to 72 years; 68% were female and 71% were married. The majority (73%) had less than 12 years of education. Most participants came from Mexico (74%) and the average length of time in the U. S. was 9 years. The majority did not have health insurance (92%). Sixty percent of the participants had household income less than $10,000, and 40% reported having financial strain (unable to pay their monthly bills) (Table 1).

The length of time participants had been diagnosed with diabetes averaged 4.5 years (±0.25). Most participants were overweight or obese (93.2%), with poor diabetic control (HbA1C > 7%). The average BMI was 32.42 (SD = 5.89) (obese), 29.8% were overweight and 63.2% obese. Half of the male participants (52%) had a waist circumference > 102 cm/40 inches (high risk) and the majority of female participants (90%) had a waist circumference > 88cm/35 inches. Most were at moderate (30.5%) or high nutritional risk (64%). The majority took oral medications for diabetes, but 25.6% were on insulin. Only 17% met physical activity recommendations; 8.6% of the participants were currently smokers and 27% were previous smokers. The most frequently reported comorbidites were hypertension (51%), followed by kidney disease (25.4%), heart disease (12.3%), and stroke (5.1%). Seven percent of the participants reported a previous heart attack. Half of the sample reported a family history of diabetes (50%).

Quality of life and Health-Related Quality of Life

Almost half of the participants (44.1%) rated their health as fair or poor. Mean scores on the health-related quality measures by the SF-12 and the QLI are presented in Table 2. The lowest

self-rated health-related aspect of quality of life was general heath (M=44.66), followed by mental health (M=48.30), role emotion due to health problems (M=59.54), the mental health component (MCS) (M=60.22) and the physical health component (MCS) (M=62.44). Participants were least satisfied with health and functioning (M=22.11), followed by social and economic function (M=23.13). The greatest satisfaction was with family (M=25.21).

Correlations and Multiple Regression

Pearson's correlation coefficients (r) indicated that physical activity was significantly correlated with quality of life ($r = .24$, $p < .05$), and nutritional health was significantly correlated with quality of life ($r = -.35$, $p < .05$) (Table 2). No variables were significantly correlated with the PCS ($p > .05$) or the MCS ($p > .05$) of health-related quality of life.

A regression model including predisposing factors (age, BMI) and behavior (nutritional health and adherence to physical activity recommendations [yes/no]) was significantly predictive of quality of life ($R^2=0.21$, $F=3.63$, $p < .05$), explaining 21% of variance in the QLI. Predisposing factors and behavior did not significantly predict scores on the PCS ($F = 0.99$, $p > .05$) or the MCS of health-related quality of life ($F = 0.53$, $p > .05$).

Discussion

Quality of life and health-related quality of life

In the current study, Hispanics with diabetes perceived their health to be fair or poor and rated their general health as lowest in health-related quality of life. These findings are consistent with previous studies in which Hispanics consistently reported poor or fair health and low quality of life (Garcia, 2008; Magwood, Zapka, & Jenkins, 2008) and health-related quality of life (CDC, 2008b, Dubard & Gizlice, 2008; Graham et al., 2007). Participants also reported that they were least satisfied with health and functioning, suggesting that the burden of disease for Hispanics with diabetes may lead to progressive impairment of their functioning in general health. Similarly, Brown and colleagues (2004) reported that diabetes was associated with perception of poor general health and impaired physical functioning. The fact that the majority of participants in this study had comobidities may have contributed to their low perceptions of health-related quality of life. A recent study indicated that comorbidities had the largest impact on health-related quality of life among people with diabetes (Maddigan, Feeny, Majumdar, Farris, & Johnson, 2006). Other factors that might have been related to their perceptions of poor health were economic barriers to treatment, late diagnosis, and morbidity and mortality from diabetes and its complications (Agency for Healthcare Research and Quality, 2007).

These Hispanics with diabetes reported lower scores on the mental health component of health-related quality of life than on the physical health component. The findings are consistent with previous reports which found that persons with diabetes showed poorer mental health than physical health on health-related quality of life (Glasgow, Ruggiero, Eakin, Dryfoos, & Chobanian, 1997; Graham, et al, 2007). Hispanic adults with diabetes in this study reported poor mental health and role emotional limitation due to health problems. Participants in this study had substantially poorer health-related quality of life in the domains of mental health ($M = 48.30$ v.s. $M = 59.70$ and social functioning ($M = 69.64$ v.s. $M = 77.50$) than in a large national sample of adults with diabetes (Glasgow et al., 1997). The findings are consistent with the study that Latinos had the lowest scores in mental health component of the health-related quality of life compared to other ethnic groups (Huang et al., 2009). An epidemiologic study has shown that education, social economic status, social assistance, stress, physical activity and sense of belonging are attributable to health-related quality of life (Maddigan et al., 2006). The findings that the sample had low literacy, a low level of education, low socio-

economic status, and were not physically active, might help to explain their poor health-related quality of life.

Relationships among predisposing factors, behavior and quality of life and health-related quality of life

Previous studies have found that physical activity and diet are associated with quality of life and health-related quality of life in the general population and in Hispanics (Brown & Balluz et al., 2003; Li et al., 2007; Sawatzky et al., 2007; Wendel-Vos et al., 2004). The findings of the study support the Phases II (Epidemiological assessment) and III (Educational and ecological assessment) of the PRECEDE-PROCEED Planning Model in Hispanic adults with diabetes for quality of life measured with the QLI but not the SF-12. Predisposing factors (age, BMI) and behavior (physical activity and nutritional health) together explained 21% of variance in health-related quality of life, with physical activity and nutritional health as the strongest predictors. Similar findings were found in U. S. adults with diabetes from the Behavioral Risk Factor Surveillance Survey (Li et al., 2007) that healthy lifestyle including non-smoking, engaging in adequate leisure time physical activity, and consume five or more servings of fruits and vegetables per day was associated with better health-related quality of life. Using the PRECEDE-PROCEED Planning Model, 21% of the variance in health-related quality of life was explained by predisposing factors and behavior. This suggests that there may be other variables that influence health-related quality of life in Hispanic adults with diabetes.

Our findings were that Hispanics with diabetes who engaged in recommended physical activity perceived better quality of life. The relationship of physical activity to health-related quality of life has been supported in other studies. Adults who regularly had recommended levels of activity reported better health-related quality of life and health status than those who were physically inactive (Brown et al., 2003; Li et al., 2007). Wendel-Vos and colleagues (2004) found a positive relationship between leisure time physical activity and health-related quality of life for general health perception, vitality and social functioning. The fact that the majority of participants in the current study did not meet physical activity recommendations may have contributed to their low perceived health-related quality of life. Physical functional limitations due to diabetes complications also may have also influenced their poor quality of life (Garcia, 2008; Polonsky, 2000).

Obesity was not a strong predictor of QOL, though previous research has shown that obesity is negatively associated with health-related quality of life in the general U.S. population. High BMI and waist circumference and low levels of physical activity are consistently associated with poor quality of life (Glasgow et al., 1997). People who engaged in moderate or vigorous physical activity tended to have a low risk of being obese and perceived a better health-related quality of life among individuals at different levels of BMI (Jia & Lubetkin, 2005; Rejeski et al., 2006).

Nutritional health was a strong predictor of health-related quality of life in this study. Keller and colleagues (2004) also found a relationship between nutritional health and quality of life in older community dwelling adults suggesting that nutrition had the potential influence on quality of life in physical, psychological and interpersonal perspectives. Another study reported that Hispanics with diabetes had difficulties with dietary management and perceived poor quality of life due to dietary restrictions (Misra & Lager, 2009).

Limitations

This study used a small, non-probability sample from the community, reducing the potential to detect significant relationships and limiting the generalizability of the results. Further, while

using native Hispanic interpreters for face-to-face interviews could strengthen the validity of the study, responses may have been prone to social desirability. Nevertheless, the study findings support the literature and the relationships among predisposing factors, behavior and quality of life in this sample of low-income Hispanic adults with diabetes.

Implications

Community health nurses need to develop interventions using holistic and contextual approaches to Hispanics with diabetes. For example, nutrition alterations must include culturally acceptable diet and food preparation. Physical activity behaviors must include families, developing and utilizing options in the local community or church, be economically feasible, and consider the patriarchal or matriarchal beliefs and practices. As noted by Magwood et al., (2008) and Garcia (2008), the growing Hispanic community requires different methods and strategies for effective interventions. The new focus on patient centered care demands a more clear understanding of culture and acculturation and the role they play in meeting patient needs. Formal and continuing education of nurses and other health professionals requires inclusion of culture specific health knowledge, strategies, and care provision. Regardless of the purpose (practice, research or education) culturally competent intervention strategies must include factors that improve and enhance quality of life and the symptoms and management requirements of Hispanic diabetics. Continued research to identify those requirements and effective efforts is needed.

Conclusions

This sample of Hispanics with diabetes had poor quality of life both on a disease specific and the general health-related quality of life measure. Similar to other population groups, a variety of factors were related to quality of life. Physical activity and nutrition, so important to diabetes management, had impacts on the quality of life measures. Physical and mental function, overall wellbeing, and social expectations are part of a person's perception of his or her quality of life. Interventions must include the context of quality of life for Hispanics with diabetes and necessitate innovative strategies to meet the needs of this population to live an optimal life.

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Table 1

Demographic and Health-Related Characteristics of the Participants (N=59).

Variables	N	Mean	SD	%
Age		48	12.56	
Gender				
Female	40			67.8
Male	19			32.2
Married	39			70.3
Widowed	3			5.5
Divorced	4			7.3
Country of Origin				
US	2			3.4
Mexico	43			72.9
Puerto Rico	2			3.4
Other	12			20.3
Triglycerides		238.86	142.64	
Cholesterol	58	184.14	44.97	
HDL	56	42.23	11.30	
LDL		113.5	38.89	
Blood Pressure	59			
Systolic		140.14	19.75	
Diastolic	59	84.92	11.37	
BMI in kg/m^2		32.43	0.50	
Hypertension	30			50.8
Heart Disease	7			12.3
Kidney Disease	15			25.4
Stroke	3			5.1
Ever Smoked	17			56.7
Smokers	5			8.6
Nutritional Risk:				
Low	4			6.8
Moderate	18			30.5
High	37			62.7

Table 2

Mean Scores of the SF-12 and the QLI (N=59).

Variable	Mean	SD
SF-12:		
PF	71.61	35.19
RP	64.84	27.71
BP	68.84	29.94
GH	44.66	26.36
VT	63.53	27.20
SF	69.64	25.46
RE	59.54	29.39
MH	48.30	17.13
PCS	62.44	22.18
MCS	60.22	16.83
QLI:	23.40	3.55
HF	22.11	4.68
SOC	23.13	4.20
PSP	24.95	4.67
FAM	25.21	3.70

Table 3

Pearson's correlation matrix (N=59).

Variable	1	2	3	4	5	6	7
1. Age	–						
2. BMI	−.163	–					
3. PA met	.041	.085	–				
4.Nutritional Health	.235	−.178	.103	–			
5. QLI	−.136	.008	.240*	−.350**	-		
6. SF-12-PCS	−.193	.131	−.064	−.190	.510**	-	
7. S-12-MCS	−.125	.063	−.023	−.172	.455**	.611**	-

* P < .05

** p<.01

Table 4

Multiple Regression of Significant Predictors of the Quality of Life (QLI) (N=59)

Variables	Quality Of Life		
	B	SE	a_β
Step 1. Age	−0.14	.04	−.05
Step 2. BMI	−.07	.04	−.10
Physical Activity	2.91	1.24	.29*
Nutritional Health	−.37	.12	−.39*

[a] Beta shown are for the last step.

* p<.05.

Note. Step 1: R^2 = .01, ΔR^2 =.01, F (2, 56) = .34, p >.05.
Step 2: R^2 = .21, ΔR^2 =.20, F (2, 56) = 6.71, p < .05.