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Research Article

PERCEIVED BARRIERS AND LIFESTYLE OF A PERSON RECENTLY DIAGNOSED WITH TYPE 2 DIABETES

Morales-Nieto, A^{1*}, García-Solano, B¹, Flores-Merlo, M¹, De León-Gómez, A²,
Cárdenas-Villareal, V.M³ and Salazar-González, B.C³

¹Universidad Autónoma de Puebla, Facultad de Enfermería

²Instituto Mexicano del Seguro Social

³Universidad Autónoma de Nuevo León, Facultad de Enfermería

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ABSTRACT

Objective: to determine the relationship between biological, psychological and sociocultural personal factors, perceived barriers, family support behaviors, modeling of family members, neighborhood surroundings, and the lifestyle practice for type 2 diabetes (T2D), in recently diagnosed patients. **Method:** descriptive, correlational, cross sectional study, non-probabilistic sampling, and a sample of 130 people between the ages of 20 and 50 was used. Seven validated instruments and a sociodemographic data sheet were used. The data were collected from patients with T2D attending two public health centers, those who were diagnosed ≤ 2 years were invited to participate in the study. The data was analyzed with the Statistical Package for the Social Sciences, (SPSS) version 21. **Results:** the average age was 44.40 years (SD= 5.69), and schooling of 8.98 years (SD= 4.60), 60.8% were female (79). The final model $F(2,127) = 13.68, p < .001, R^2 = 16\%$, showed that perceived barriers and the health center were significant to explain lifestyle practices. More perceived barriers had a negative effect on lifestyle practices, while participants from the urban center showed more lifestyle practices. **Conclusion:** Less perceived barriers showed more lifestyle practices.

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INTRODUCTION

In Mexico, different government programs have, as health promotion policy, the early detection of chronic diseases with all the insured persons who attend consultation. Type 2 Diabetes (T2D) is among the main diseases. Insured persons are those who have a formal work in some kind of company (Social Security). For those who have not a formal work the Seguro Popular (Popular Security) is a social inclusion program that provides medical consultation, at no cost.

The social security programs direct their efforts to delay the complications associated to the T2D. Education is the main pillar of these programs. It focuses on healthy nutrition, physical activity, consumption of oral hypoglycemic, appropriate stress management, self-monitoring glucose levels, learning how to identify signs of alarm of hypo and hyperglycemia, as well as taking care of their feet and oral cavity (Instituto Mexicano del Seguro Social, 2011; PREVENIMSS, 2014, Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, 2013,

PREVENISSSTE, 2013).

Nevertheless, in spite of these efforts, out of the total number of diagnosed people and that receive treatment, only 25% showed evidence of good metabolic control (Encuesta Nacional de Salud y Nutrición - National Survey of Health and Nutrition, [acronym in Spanish, ENSANUT], 2012). This percentage is equivalent to 1.6 million people out of 6.4 million diagnosed that year. That survey reveals that 63% of the people diagnosed attended consultation for their control and early detection of complications. Also 84.7% of the people surveyed stated that they received treatment with oral hypoglycemic agents, although a low percentage (21.7%) reported monitoring their metabolic control by means of the glucose evaluation in blood and 7.7% through glycosylated hemoglobin. Compliance with the non-pharmacological treatment (nutrition and exercise plan) was very low 6.8%. Diverse studies report the low adoption of actions in relation to diabetes treatment, suggesting that people recently diagnosed with the disease rarely adopt self-care behaviors related to their dietary patterns, physical activity, taking medication and attending medical checkups (Avila *et al*,

*Corresponding author: Morales-Nieto, A
Universidad Autónoma de Puebla, Facultad de Enfermería

2013; Cheng *et al*, 2016; Wycherley *et al*, 2012). These data show the necessity to research personal and situational (neighborhood environment), perception of illness, barriers, and family support in relation to lifestyle practices in people with type 2 diabetes (T2D). The Health Promotion Model (HPM) (Pender, Murdaugh, & Parsons, 2015), was considered suitable to guide the study since it contains concepts to understand the lifestyle practices of with a recent diagnosis of T2D. In this study four propositions of the model were retaken. Perception of illness represented a psychological factor according to the HPM, perceived barriers for care of T2D stand for perceived barriers, family support and modeling of a directive relative in relation to care of T2D both, represented interpersonal influences in the HPM, the neighborhood environment represented situational influences, and lifestyle practices represented the health promoting behavior of the HPM. Additionally the international physical activity questionnaire was applied and capillary glycemia was obtained.

MATERIALS AND METHODS

Descriptive, cross-sectional, correlational study. 130 subjects participated between the ages of 20 and 50 years; with a T2D time of diagnosis of ≤ 24 months, and who attended two health centers. Health centers are classified as urban and suburban in the city of Puebla, México.

The Perception of the Illness was used (Moss Morris *et al*, 2002), and validated by Pacheco *et al*. (2012). It consists of 36 questions, with a Likert type answer pattern of 5 points, that range from strongly disagree = 5, to strongly agree = 1. The scores can oscillate between 36 and 180 points, the greater the score obtained, the more consistent and positive the perception of the disease.

The Barriers in Diabetes Questionnaire (Mollen *et al*, 1996) was used to assess the barriers for the care of diabetes. The reliability coefficient reported by the authors was .85. It consists of 23 questions with 5-point Likert-type responses, ranging from never = 1, to always = 5. The score varies between 23 and 115 points, the higher the score, the greater the perception of barriers.

The *Lista de Comportamientos de Apoyo en Diabetes* (The Diabetes Family Support Behavior Checklist) was also applied to assess the support of the family. This instrument was developed by Glasgow and Toobert (1988), translated into Spanish and culturally validated by Mendoza and Gallegos (2014). It consists of 16 questions distributed in two dimensions: a) supportive behaviors and b) obstructive behaviors. The behaviors include: diet, exercise, glucose testing, adherence to the treatment and support per se with a 5-point Likert-type response scale, ranging from 1 never to 5 at least once a day, the score ranges between 16 and 80 points. The higher the score, the higher the perception of family support.

Modeling of the family member with T2D was assessed with 7 questions developed for this study. Questions are about observing a direct family member eating different from the rest of the family, restraining for some foods, attending to the physician, among others. It has 4 response options, its score

varies between 7 and 28 points; higher score shows more observed behaviors observed in the family member with T2D.

To assess the neighborhood environment, the Neighborhood Environment Walk ability Scale-Abbreviated was applied (Cerin *et al*, 2006). This scale has 15 questions with four answer options, 1 = completely disagree and 4 = completely agree. Its score varies between 15 and 60 points. Higher scores indicate better conditions for undertaking physical activities. The diabetes self-care behavior, the *Instrumento de Medición del Estilo de Vida en personas Diabéticas* (Instrument to measure lifestyles in persons with diabetes) was applied ([IMEVID], Lopez *et al*, 2013). It consists of 25 questions distributed over seven domains: nutrition, physical activity, tobacco use, alcohol use, diabetes information, emotions and adherence to therapy. The response options range from Never to Almost Always (0-4 points). Scores range between 0 and 100. Indices 0-100 points were obtained from each of the instruments applied, in order to be able to make comparisons between them.

To complement self-care behavior the "International Physical Activity Questionnaire" (IPAQ), was applied. It has seven questions about physical activity carried out in the last seven days and it is classified as strenuous physical activity, moderate physical activity, walking and inactivity. The overall result is obtained from the sum of the duration in minutes and the frequency in days of the four types of activity. The values of the questionnaire are multiplied by the METs (measurement of energy expenditure equivalent to 1.2 Kcal/kg/h) by the minutes and by 5 days.

Data sheet contains general information of the participant, it includes age, sex, body mass index (BMI), family history of diabetes, capillary blood glucose at the time of diagnosis and at the time of the data collection, months since diagnosis and abdominal circumference (personal biological factors), schooling, occupation and marital status (personal socio-cultural factors).

Capillary glycemia at time of diagnosis was obtained from each participant's clinical record, and time of data collection was obtained, before applying the instruments. Patients were asked to come in fasting conditions, immediately a light breakfast was offered. The blood sample was taken by the principal investigator, drawing a drop of capillary blood, using test strips and an Abbot brand glucometer model FreeStyleOptium Neo, Abbot test strips for glucometer model FreeStyleOptium Neo, lancets of the same brand for a lancing device and cotton wads with alcohol.

Data Collection

Potential participants were approached as they arrived at the health center and requested consultation in the Module for patients with chronic diseases. They were asked if they had a T2D diagnosis and how long had they been diagnosed. If the response was affirmative and the diagnostic time was ≤ 2 years, the patient was invited to participate in the study. The aim of the study was explained for him or her and the procedures to be performed, when the participant agreed, he/she was asked to sign an informed consent and questionnaires were read to him

or her by the PI, socio-demographic information was registered in a data sheet.

The levels of capillary glucose at the time of the T2D diagnosis were obtained from the participant's medical record and a sample was drawn at the time the participant was interviewed.

Analysis Strategies, descriptive statistics for the categorical variables were obtained, the reliability of the instruments was obtained through Cronbach's Alpha, Spearman's correlation coefficients, Mann-Whitney U, and multiple lineal regression models.

This study was approved by the committees: Research, Ethics and Biosafety of the Faculty of Nursing of Nuevo Leon Mexico and registered with the number FAEN-D-1213. The ethical principles for research considered in the Declaration of Helsinki, 1975, were followed, and all participants signed informed consent.

RESULTS

The average age of the 130 participants was 44.40 years (SD =5.69), 79 (60.8%) were women. The participants came from two public health institutions denominated suburban and urban center (n = 65 participants, from each health center). Most, 60.8% (n = 79) indicated having a partner. With regard to physical activity 23.8% (n = 31) classified in intense physical activity, 9.2% (n = 12) in moderate activity, 62% (n = 81) walking 10' per day, and 4.6% (n = 6) no activity.

All instruments obtained acceptable reliability coefficients except for the support behavior questionnaire that was below .45. The correlation matrix was revised for correlation coefficient increase if item was deleted. It was decided to eliminate 6 questions, and an acceptable coefficient .70. was obtained (table 1). The questions that were eliminated had the term criticize, e.g. Your family criticizes you for not exercising regularly; You are criticized for not writing down the results of your capillary blood glucose.

Table 1 Reliability Coefficients of the Instruments

Instrument	Questions	Cronbach'salpha
Perception of Disease	35	.66
Perceived Barriers	23	.91
Support behaviors in Diabetes	11	.70
Modeling of the Family Member with T2D	16	.85
Neighborhood Environment	15	.85
T2D Self-care	25	.78
International Physical Activity Questionnaire	7	.60

Differences between medians among the participants were explored by urban and suburban health center, through the Mann-Whitney U test in all variables of the study. The perceived barriers, neighborhood environment, and self-care behaviors showed significant differences: Mann-Whitney U test 1344.00, p < .001; 1440.50, p = .002, and 1399.00, p < .001, respectively. The medians suggest that the suburban center participants perceive more barriers for T2D self-care than the urban center participants, even though they also perceive an environment more suitable for exercising and paradoxically reported less self-care conducts for T2D. The matrix of correlation (table 2) showed that the higher the barriers perceived for T2D self-care, the perception of the disease is more consistent with T2D and positive; the greater the

perceived barriers, the less family perceived support behaviors, and less self-care for T2D, but more perception consistent with the disease.

Table 2 Spearman's correlation coefficient

	Education	Barriers to T2D Lifestyle practice
BMI	-.253**	Ns
Perception of Disease	.191*	.212*
Supporting behaviors	ns	-.177*
T2D self-care behaviors	ns	-.384**

Note: * significant value

Multiple linear regression models were adjusted (table 3) using as independent variables age, sex, education, marital status, occupation, family member with diabetes, BMI, diagnostic time in months, abdominal circumference, capillary blood glucose at the time of diagnosis and at the time of the interview, perception of the disease, perceived barriers and health center, and as dependent variable the T2D self-care behavior.

Table 3 Lineal multiple regression model of barriers and health center on lifestyle practices for T2D

General Model	Sumofsquares	gl	Mean Square	F	p
Model	3407.98	2	1703.98	13.68	.001
Residual	15813.22	127	124.51		
Coeffientes					
	B	EE	β	p	IC 95%
Model					LI LS
Constant	65.911	4.272		.001	54.45 974.36
Perceived Barriers	-.160	.045	-.301	.001	-.249 -.072
Health Center (urban/suburban)	5.366	2.044	.221	.010	1.321 9.412

Lower limit: LI, Upper limit: LS R² = 16%

The first model was significant, although only the perceived barriers to diabetes care was significant. The backward technique was applied and each of the following variables were eliminated one by one, in the following order, according to the highest value of p: neighborhood environment, occupation, sex, modeling of the family member with diabetes, capillary blood glucose at the time of diagnosis, family support, perception of disease, BMI and current capillary glycemia. The final model F (2,127) = 13.68, p < .001, R² = 16%), showed that perceived barriers and the health center were significant to explain lifestyle practices. More perceived barriers had a negative effect on lifestyle practices, while participants from the urban center showed more lifestyle practices.

DISCUSSION

According to the health promotion model, it was expected that the perceived barriers, the family support, the modeling of the family member, and neighborhood environment would show an effect on the self-care behaviors of the recently diagnosed patient with T2D. Of these variables, only the perceived barriers showed a negative effect on the self-care behaviors, in that sense Cheng *et al.* (2016) also observed a negative effect on diet. Wycherley *et al.*, (2012), describe the lack of knowledge about diet, the disease, economic difficulties and the lack of family support as the main barriers to develop healthy behaviors.

However, the perceived barriers were correlated with consistent and positive perception of the disease. The health promotion model postulates that people are more likely to participate in

health promoting behaviors when other people, important to them, model this same behavior and provide assistance and support. The modeling of the family member had no effect on the self-care behavior, perhaps due to the fact that the least observed behavior in the family member was the diet, different to that of the rest of the family. Contrary to this one, the findings of several studies reveal the importance of family support on self-care behaviors (Canales & Barra, 2014; Gomes et al, 2012). In contrast, Ponce et al. (2011), similarly to this study, found no relationship between family support and HbA1c level despite the fact that the means of family support were far superior to those found in this study. Another possible explanation for the non family support was the fact that approximately 39.2% did not have a partner and lived alone or with a family member who worked and therefore spent only a little time with him or her.

No studies on the conduct of modeling and diabetes self-care were found. Scollan, et al, (2007), reported that the recollection of the control of diabetes and the social consequences of a close family member and the person with diabetes were associated. However, they did not seek a relationship between the memory of control of the family member and the behavior of the patient. According to Bandura (1986) the confidence to be able to carry out certain conduct is based on four types of information, among which stands out the vicarious experience that results from observing the actions of others and the related self-evaluation, as well as the feedback. A possible explanation is that their eating behaviors are consistent with those observed in their family member and not with the questions asked in this study.

Correlations showed that more perceived barriers, and less perceived family support, the lifestyle practices went down. The effect of the neighborhood has been contradictory. Diaz et al, (2015) reported a relationship between the neighborhood environment (walking parks) and low results of A1c in people with T2D. Rodriguez et al, (2013) found no relationship between the probability of physical activity and the existence of bike lanes and low-cost recreational areas. In this study the environment of the neighborhood was not related to diabetes care, nor to physical activity. In spite of the fact that the patients in the suburban center perceived better conditions for exercise in their environment, perform less physical activity than in the urban center. The Health Promotion Model proposes that biological personal factors affect health promoting behavior. This study found an inverse relationship, older age was related to less the self-care behaviors. Since patients had been recently diagnosed, it is likely that those diagnosed at an older age also have less schooling and therefore fewer opportunities to learn about the disease. The participants from the urban health center obtained higher scores in the self-care behaviors. This could be due to the fact that this health center offers talks on diabetes care, though this result was not reflected in the figures of capillary glycemia, which were very similar in the participants of both health centers.

CONCLUSION

The selected propositions from the Health Promotion Model were tested: 1) The perceived barriers can limit health promoting behavior. This proposition was supported by a linear

regression model which shows that the perceived barriers of the person with T2D significantly influence the T2D self-care behaviors. 2) People are more likely to participate in health promoting behaviors when other people important to them model this same behavior and provide assistance and support. This study found no association between the modeling of a direct family member with T2D in self-care behavior of diabetes; however, the proportion of four out of the seven care activities observed in the immediate family member was above 40 percent. It is likely that the questions posed need to be rethought. 3) Family can increase or decrease the participation of a person with T2D in health promoting behaviors. In this study the support of the family showed no significant effect on the self-care behavior of people with T2D, which can be explained on the basis that 39.2% has no partner and live alongside other relatives, brothers, sons or nephews that work therefore patients spend most of the day alone. 4) The situational influences on the external environment may increase participation in health promoting behavior in the person with T2D. This study explored neighborhood characteristics and occupational characteristics as a source of influence. Participants from the suburban health center perceived more opportunities to exercise in the neighborhood. However, on the linear regression model, the neighborhood environment showed no significant effect on lifestyle practices.

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