

Psychosocial Factors Affecting Behavior Modification in Diabetic Patients

A qualitative and quantitative analysis of patients with Type II Diabetes Mellitus in a primarily Hispanic population at Northeast Community Clinics in Downtown Los Angeles.

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A Note on the Study Design: I began the Primary Care Leadership Program interested in behavior change in diabetic patients, and had planned to assess patients' prediction of their Hemoglobin A1c scores as well as their adherence to diet, exercise and medication regimens. After a few days of preliminary interviews it became clear that this study design would have to be revised. None of the patients interviewed were familiar with the concept of Glycosylated Hemoglobin, even when explained as "average blood sugar," and questions about adherence were met with apathy. The evidence of the poverty of these patients' relationship to their health lead me to wonder about the factors contributing to the relative nonparticipation that I encountered. The problem was certainly not a lack of available information or involved providers. As I explored psychological frameworks that could underlie these behaviors, I changed my study design to focus on the psychological concept of Locus of Control.

Background: The connection between glycemic control and psychosocial factors has been well established in medical literature. Factors such as anxiety, stress, lack of social support, low level of education, and emotional personality type have all been correlated with poor glycemic control in patients with diabetes mellitus (Lloyd et al 1993, Niemcryk et al 1990, Peyrot et al 1999), in

which strict adherence to a diabetes regimen is essential for long-term management of blood glucose.

A number of studies have chosen to focus on Locus of Control when exploring health-related behaviors. Locus of Control is a psychological model which categorizes personal beliefs regarding one's control over outcomes. The concept first appeared in Rotter's Internal-External Locus of Control Scale in 1966 (Rotter, 1966), and copious the research on the topic that followed continuously reinforced the positive effect of a more internal Locus of Control on life outcomes in areas as diverse as financial success, productivity, relationships, and finally, health.

Rotter's Internal-External Locus of Control Scale was later modified for use in health psychology by Wallston, et al (Wallston et al 1976, 1978), who developed the Health Locus of Control scale and the Multidimensional Health Locus of Control scale, which quantify the generalized expectation about whether one's health is controlled by one's own behavior or by forces external to oneself. The Multidimensional Health Locus of control scale included a functional discrimination between different external control loci and control attributed to chance, and first introduced the idea of "the powerful other," an authority which in the context of healthcare most often meant a physician. These scales have been further modified and applied to obesity, mental health, cancer, and diabetes in a number of studies.

Among the studies that have specifically investigated the relationship between Locus of Control and self-care in diabetic patients, a few have found that perceived control is negatively related to health outcomes (Morowatisharifabad et al, 2010, Peyrot et al, 1994), a highly specific measure of long-term blood glucose and predictor of many complications of diabetes, particularly retinopathy and nephropathy. Despite the strength of these studies, however, the data

linking health-related behaviors and internal locus of control appears to be ambiguous when taken as a whole. Additionally, the relationship between locus of control and health behaviors appears to vary with the cultural setting, and a few recent studies have sought to explore the relationship within, rather than between cultures (Morowatisharifabad et al, 2010).

This study aims to explore whether perceived control, as quantified by and index of patient Locus of Control, is related to glycemic control, using glycosylated hemoglobin as its main index. The relationship between glycemic control and other psychosocial factors will also be examined, and the patients' understanding of glycemic control will be qualitatively reviewed. A negative relationship between Internal Locus of Control and Hemoglobin A1c is expected, as well as a positive relationship between external locus of control and Hemoglobin A1c.

Methods: A sample of diabetic patients was obtained through one week of surveys in the downtown Los Angeles location of Northeast Community Clinics. All patients with type II diabetes seen during this week were given a survey in both English and Spanish and demographic data were obtained. The last Hemoglobin A1c lab result on file was recorded by a provider, as well as the date of the lab result, and patients without a current Hemoglobin A1c result (within 1 year of the survey), were removed from the sample. The survey contained the following six questions:

1. What are your life goals? Please list three.

¿Cuáles son sus metas en la vida? Por favor escriba tres.

This question was intended to function as an extremely shortened mental status exam prior to broaching the topic of diabetes with the patients, and to explore wellbeing and long-term thinking. The diction was intentionally open-ended so as not to limit the patients to health-related topics, and also in an effort to illicit heterogeneous responses that could be used in the qualitative portion of the study.

2. On a scale of 1 to 10, how much control do you feel you have over your diabetes?

En una escala del 1 al 10, ¿cuánto control cree usted que tiene sobre su diabetes?

1 2 3 4 5 6 7 8 9 10

no control

a lot of control

3. On a scale of 1 to 10, how much control do you feel your doctor has over your diabetes?

En una escala del 1 al 10, ¿cuánto control cree que su médico tiene sobre su diabetes?

1 2 3 4 5 6 7 8 9 10

no control

a lot of control

These questions were intended to examine locus of control using a multidimensional, diabetes and provider-referenced scale. The results provided three values: Perceived internal control (the first answer), Perceived external control (the second answer), and internal–external locus of control (first answer minus second answer). A fourth measure on the multidimensional scale, “chance control,” was assigned to patients who chose low values for both questions.

4. How do you feel you can improve your control of your diabetes?

¿Cómo piensa usted que puede mejorar el control de su diabetes?

This question was intended to provide qualitative information regarding perceived control with reference to diabetes.

5. What do you think is the best way to know if your diabetes is getting better?

¿Cómo cree usted que es la mejor manera de saber que su diabetes está mejorando?

This question was intended to illicit qualitative evidence to explore how patients measure the progress of their diabetes. It was ultimately excluded from the results due to translation errors.

6. How will you know when you are successful in managing your diabetes?

¿Cómo va a saber cuándo logre el éxito en el manejo de su diabetes?

This question was included in the survey to gain a qualitative understanding of the endpoints that patients use to define success in managing diabetes.

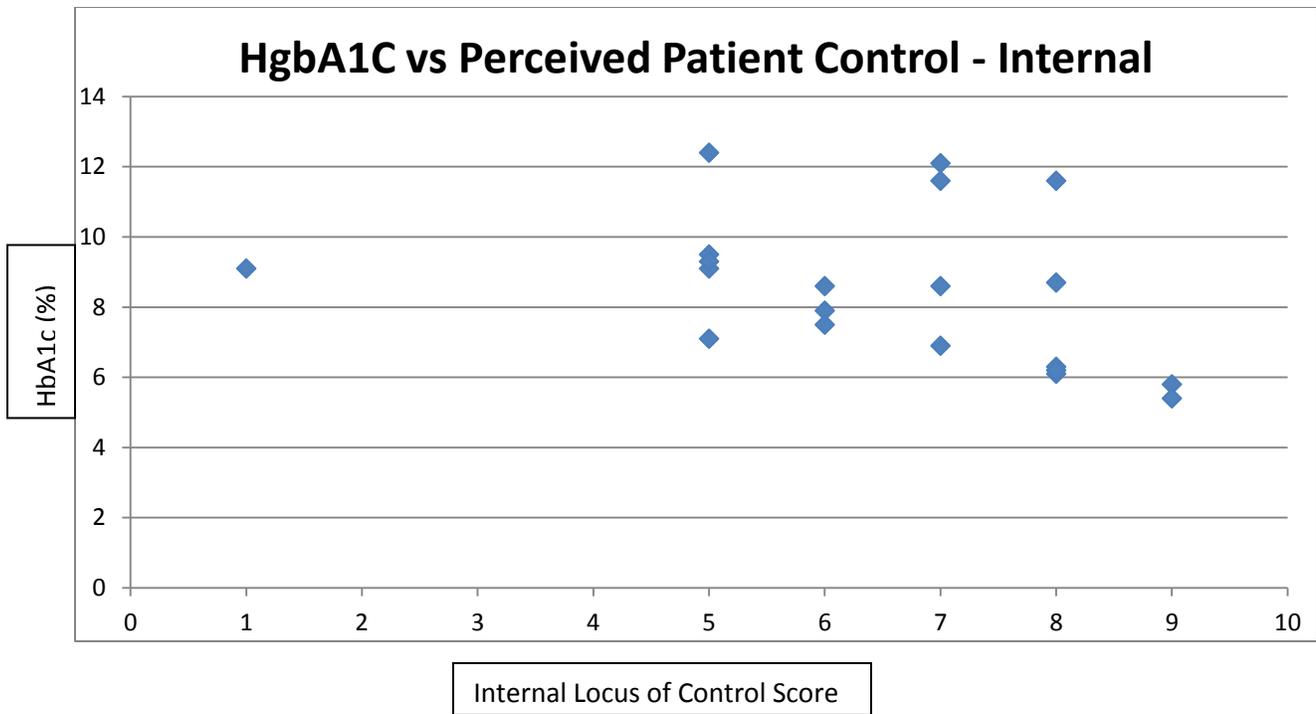
Results: Twenty patients with type II diabetes mellitus met the inclusion criteria for the study. Of these patients, 17 of 20 completed surveys in Spanish. The mean age of patients was 58 and the mean Hemoglobin A1c score was 8.5%, indicating a trend of uncontrolled blood glucose in this patient population.

The average perceived Internal Locus of Control score, or the answer to question 2, was 6.5, while the average perceived External Locus of Control score was 7.6. The difference,

referred to here as the Internal-External Locus of Control score was -1.1, the negative value indicating that on average more control of a patient's diabetes was attributed to the physician than the patient.

The Kruskal-Wallis test was used to discern a difference in Internal, External, and Internal-External difference scores between three groupings of Hemoglobin A1c scores, patients with pre-diabetic Hemoglobin A1c levels, or extremely well controlled diabetes (<6.4%), patients with levels of Hemoglobin A1c consistent with controlled diabetes (6.5% - 7.9%), and patients with levels of Hemoglobin A1c which indicate uncontrolled diabetes (>8.0%). There was no difference in External Locus of Control scores or Internal-External scores between these three glycemic control categories. A statistically significant difference between the Internal Locus of Control scores existed between the three categories of glycemic control, with the well-controlled diabetes group (Hemoglobin A1c <6.4%) having the highest scores for Internal Locus of Control ($p = 0.009$).

After obtaining this statistically significant result, a Spearman rank correlation was to test for a correlation between each Locus of Control score (Internal, External, and Internal-External) and discrete Hemoglobin A1c values. No relationship was seen between External Locus of Control score or Internal-External score and Hemoglobin A1c level. A strong inverse correlation between Internal Locus of Control score and Hemoglobin A1c value was present ($r = -0.54$, $p = 0.001$).



As the surveys were read, it became clear that the qualitative data from the study could be grouped into a few categories for each question. For question 1, “What are your life goals? Please list three.” answers were scored for inclusion of four themes: diet/exercise/weight/diabetes management, work, family, and happiness/wellbeing/general health. Fifteen out of twenty patients included life goals not related to diabetes and the most common answers were diabetes-related. The raw data are presented below:

Life goals: weight/diet/exercise/DM	14
Life goals: work	5
Life goals: family	3
Life goals: happiness/health/wellbeing	12

Purple = non-diabetes related life goals

Answers to question 4, “How do you feel you can improve your control of your diabetes?” were scored in four categories: diet, exercise, medication compliance, and visits to a primary care provider. Of these categories, diet and exercise were considered to be fully self-initiated behaviors and medication compliance was considered to be a partially self-initiated behavior. Out of 20 patients, 16 listed fully self-initiated behaviors on one listed a partially self-initiated behavior as a way to improve their glycemic control. The raw data are below:

Controlling diabetes: diet	16
Controlling diabetes: exercise	3
Controlling diabetes: medication	5
Controlling diabetes: PCP visits	3

Pink = self-initiated behaviors

Question 5 was removed from the results due to translation errors. Question 6, “How will you know when you are successful in managing your diabetes?” had a greater variety of given answers, including: daily blood glucose draws, lab values, medication cessation, weight loss, feeling better, and no longer having diabetes. Of these answers, daily blood glucose draws and weight loss were considered to be self-initiated measures, while other metrics which required a visit to a primary care provider were not. In contrast to Question 4, only 5 of 20 patients used self-initiated behaviors to ascertain the status of their diabetes. “Feeling better” was considered separately as it was a uniquely subjective measure, and 5 of 20 patients used how they felt to measure success in managing their diabetes.

Measure of success: blood sugar	5
Measure of success: lab values	5
Measure of success: stopping medications	2
Measure of success: weight loss	1
Measure of success: feeling better	4
Measure of success: no longer have diabetes	2

Pink = self-initiated, Yellow = subjective

Discussion: The finding of a strong negative correlation between Internal Locus of Control scores and Hemoglobin A1c values supports the hypothesis that psychological Locus of Control is related to a patient’s glycemic control. It is intuitively clear why those patients with higher scores for Internal Locus of Control should better manage their blood glucose; however the absence of a statistically significant relationship between Hemoglobin A1c and External Locus of control or Internal-External scores must be explored. It is possible that since this survey focused specifically on Locus of Control with respect to the provider, that External Locus of Control scores were consistently high, reflecting a patient’s trust in their provider’s ability rather than a devaluation of their own perceived control. If this is the case, then the survey question assessing Internal Locus of Control is a better measure of Locus of Control than either the provider-based question or the difference in these values.

The direction of causality should also be addressed, as it is not necessarily true that a more Internal Locus of Control leads to better glycemic control. The reverse causal relationship

is equally possible, and neither can be supported or refuted by these data. Perhaps people who generally have better control of their diabetes tend to develop a more internalized Locus of Control regarding their disease as a result of the positive feedback from blood draws, laboratories, and provider response.

A few trends were notable in the qualitative data. Although the question regarding life-goals was not specifically framed with reference to diabetes, a majority of the patients (14/20) listed diabetes-related life goals. Five of the twenty patients only listed life goals related to diabetes. This could suggest a high level of self-identification with the disease among these patients. These data could also be an artifact of psychological association, as the patients were surveyed in the doctor's office.

The differences in the answers to the question regarding how one would hypothetically improve their control of their diabetes and how one practically knows when they are successful in controlling their diabetes deserve mention. Both questions yielded answers that dealt with self-initiated and non-self-initiated behaviors; however the proportion of patients listing self-initiated behaviors in response to the question "How do you feel you can improve your control of your diabetes?" was significantly higher than those listing self-initiated measures in response to the question "How will you know when you are successful in managing your diabetes?" (16/20 versus 5/20). The discrepancy in responses here highlights a possible gap between education and action. While patients know that they should use self-initiated behaviors such as diet modification and exercise to improve their glycemic control, their understanding of their own progress is provider-centric. This could be a key issue in psychological strategies aiming to internalize control loci in these patients.

In conclusion, it appears that low perceived control over one's diabetes in the context of the provider-patient relationship is associated with poor glycemic control. The possible reasons for the prevalence of externalized control loci in diabetic patients in this particular community clinic setting should be explored further. Since this study used a provider-referenced External Locus of Control, the provider-patient relationship should be further examined in future research. How could this relationship be contributing to an external locus of control for diabetic patients? Is this framework culturally bound (the patient population in this study was primarily Hispanic), or is it generalizable to a larger population? And finally, what changes could be made in the way diabetic patients are treated to engender more perceived control? The qualitative data seems to suggest that helping patients use more self-initiated behaviors to measure their progress could be the first step in internalizing control loci.

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