

Self-Reported Diagnosis of Type 1 and Type 2 Diabetes and Lifestyle Change Among Uninsured Primary Care Patients

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Abstract

Introduction: The purpose of this study is to examine self-reported diagnosis of type 1 and type 2 diabetes and lifestyle change among uninsured primary care patients utilizing a free clinic.

Methods: Free clinic patients participated in a self-administered survey in May and June 2016. Patients with the following self-reported diagnoses were analyzed: type 2 diabetes only ($n = 84$), and type 1 diabetes only or both ($n = 43$).

Results: Participants who reported having type 2 diabetes only and/or were patients of the diabetes clinic were less likely to have modified diet and/or physical activity to manage diabetes compared to those with type 1 diabetes and/or those who were not patients of the diabetes clinic. Participants with hypertension were more likely to have changed diet and/or physical activity compared to those without hypertension.

Conclusion: Uninsured primary care patients may not know whether they have type 1 or type 2 diabetes. This is problematic as type 1 and type 2 diabetes require different prevention and self-management strategies. Future studies should examine the impact of misunderstanding the 2 types of diabetes on health behaviors and outcomes and explore the context of the misunderstanding.

Keywords

type 1 diabetes, type 2 diabetes, diabetes self-care, health education, medically uninsured

Introduction

Diabetes affects 9.3% of the US population, with rates that continue to increase.¹ In addition, another 8.1 million individuals in the United States have undiagnosed diabetes.¹ Diabetes is associated with other health conditions such as high blood pressure, heart disease, stroke, blindness, and kidney disease.¹ Because of the high prevalence and its impact on health, diabetes continues to be a public health concern in the United States.

Among adults with diabetes, type 1 diabetes accounts for only 5% of the diagnoses.¹ Overweight/obesity and physical inactivity are major risk factors for type 2 diabetes.² Thus, healthy diet and physical activity are vital in preventing and controlling type 2 diabetes.² Although healthy diet and physical activity are important in the well-being and cardiovascular disease prevention for not only type 2 but also type 1 patients,³ these may not be necessarily related to the prevention of type 1 diabetes.⁴ In addition, unlike patients with type 2 diabetes, patients with type 1 diabetes are insulin dependent.³ In diagnosing and treating patients, differentiating between type 1 and

type 2 is critical because prevention and control strategies are different for type 1 and type 2 diabetes. Low health literacy and confusion surrounding a diagnosis can lead to future medical problems for a patient.⁵ Thus, confusion or lack of education among patients with, or at risk for, either type of diabetes may lead to future medical problems and an inability to manage the disease. Having an accurate understanding of a diagnosis, prevention strategies, and self-care procedures could improve future health outcomes and disease management for diabetic patients and individuals at risk for diabetes.

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Despite the importance of the accurate understanding of 2 types of diabetes, little is known about self-reported diagnosis of type 1 and type 2 diabetes and its impact on diabetes self-care among uninsured primary care patients. Underserved individuals are disproportionately affected by diabetes, making the disease an especially prevalent issue for this population.⁶ Minority groups have a higher prevalence of diabetes than non-Hispanic whites.¹ Although self-care (eg, diet, physical activity, medication adherent) is important to control diabetes, low-income patients with diabetes often have difficulties with self-care because they may have food insecurity,⁷ barriers to physical activity,⁸ and low health literacy.⁵ Uninsured low-income patients may be particularly vulnerable to this as lower levels of health literacy are seen among this population.⁵ In addition to lower levels of health literacy, low-income patients need to wait at safety-net clinics due to provider shortages in low-income communities; this can lead to longer waiting period before seeing providers.⁹ Because of lower levels of health literacy and inconsistency in receiving medical attention, it can result in confusion with regard to the diagnosis of type 1 and type 2 diabetes.

The purpose of this study is to examine self-reported diagnosis of type 1 and type 2 diagnoses and lifestyle change among uninsured diabetic primary care patients utilizing a free clinic. Lifestyle change was included in this study due to its importance in preventing and controlling type 2 diabetes.¹⁰ Due to the lack of research focusing on the topic of diabetes self-reporting among free clinic patients, this study has the potential for vital literature contribution.

Methods

Setting

The current community-based research project was conducted at a free clinic, which provides free primary care services for uninsured individuals who live below 150% of the federal poverty level and do not have access to any health insurance. The clinic has 6 full-time paid personnel and over 300 volunteers, has been in operation since 2005, has no affiliation with religious organizations, is funded by nongovernmental grants and donations, and is open 5 days a week. The total number of patient visits was 15 229 in 2014. Type 2 diabetes is one of the target health problems at the clinic. The clinic provides health education programs for type 2 diabetes patients.

Data Collection

This study was approved by the institutional review board of the University. The data were collected in the free clinic waiting room in June and May 2016. All survey materials were available in English and Spanish language.

Sample

The inclusion criteria of a convenience sample of participants were age 18 years and older, were able to speak and read

English or Spanish, and were the patients of the clinic. From a free clinic, patients aged 18 or older ($N = 584$) participated in a self-administered survey in May and June 2016. Among the 584 participants, the self-reported diabetes prevalence was as follows: type 2 diabetes only ($n = 84$, 14.4%), type 1 diabetes only ($n = 22$, 3.8%), type 1 and type 2 diabetes ($n = 21$, 3.6%), and no diabetes ($n = 457$, 78.3%). This study compared 2 diabetes groups based on their self-reported diagnosis: participants with type 2 diabetes only ($n = 84$) and participants with type 1 diabetes only or type 1 and type 2 diabetes ($n = 43$). The survey participants who reported not to have diabetes were not included for data analysis because the outcome variable, lifestyle change due to diabetes, was not applicable for nondiabetes survey participants.

Measures

Diabetes-related questions. Participants were asked the following questions related to diabetes (yes or no). “Have you been a patient of a diabetes clinic of the clinic?” “Have you been told you have diabetes (type 2) by your doctor or provider?” “Have you been told you have diabetes (type 1) by your doctor or provider?” and “Do you have high blood pressure?” Participants were also asked whether they have taken steps to change their diet and/or physical activity to manage diabetes (yes or no). The questions were developed based on the input from the clinic staff who are familiar with the diabetes clinic.

Sociodemographic characteristics. The following sociodemographic characteristics were asked in the survey: age, sex, nativity (US born or not), race/ethnicity, marital status, educational attainment, employment status, and whether being a patient of the clinic for 2 years or longer.

Statistical Analysis

Data were analyzed using SPSS version 22. Independent sample t tests (for a continuous variable) and χ^2 tests (for categorical variables) were used to compare the 2 groups: participants with type 2 diabetes only (based on their perceptions) and those with type 1 and type 2 diabetes, or with type 1 diabetes only (based on their perceptions). Logistic regression was performed to predict whether a participant has taken steps to change their diet and/or physical activity to manage diabetes.

Results

Table 1 summarizes the characteristics of participants ($N = 127$). Although nearly half of the non-Hispanic participants reported they had type 1 diabetes ($n = 23$, 45.1%), less than 30% of the Hispanic participants ($n = 20$, 26.3%) indicated they had type 1 diabetes ($P < .05$). Table 2 presents the predictors of the management of diabetes (whether participants changed their diet and/or physical activity to manage diabetes). The following factors were found to have reduced the likelihood of changing diet and/or physical activity to manage diabetes: female, type 2 diabetes only, and a patient of the diabetes

Table 1. Sociodemographic Characteristics of Participants and Descriptive Statistics.^a

Frequency (%)	Total, N = 127	Self-Reported Type 2 Diabetes Only, n = 84	Self-Reported Type 1 Diabetes Only/Type 1 and Type 2 Diabetes, n = 43	P Value ^b	
Female	76 (59.8)	50 (59.5)	26 (60.5)	NS	
Race/ethnicity					
White	22 (17.3)	15 (17.9)	7 (16.3)	NS	
Hispanic/Latino/Latina	76 (59.8)	56 (66.7)	20 (46.5)	<.05	
Asian or Pacific Islander	23 (18.1)	9 (10.7)	14 (32.6)	<.01	
Some college or higher	44 (34.6)	26 (31.0)	18 (41.9)	NS	
Currently employed	46 (36.2)	27 (32.1)	19 (44.2)	NS	
Currently married	65 (51.2)	42 (50.0)	23 (53.5)	NS	
US born	24 (18.9)	16 (19.0)	8 (18.6)	NS	
Patient of the clinic—2 years or longer	85 (66.9)	56 (66.7)	29 (67.4)	NS	
Age, mean (SD)	53.48 (9.12)	53.88 (9.10)	52.70 (9.21)	NS	0.64

Abbreviations: NS, not significant; SD, standard deviation.

^aNumber (%) or mean (SD).

^bP value denotes significance from Pearson χ^2 tests between categorical variables (for cell size ≥ 5 only), and independent sample t tests test for continuous variables comparing participants with type 2 diabetes only and those with type 1 diabetes only/type 1 and type 2 diabetes.

Table 2. Predictors of Having Changed Diet and/or Physical Activity to Manage Diabetes.^a

	B	SE	Wald	Sig	Odds Ratio	Lower	Upper
Age	−0.02	0.04	0.31	NS	0.98	0.92	1.05
US born	−0.97	0.97	0.99	NS	0.38	0.06	2.54
Hispanic	−1.09	0.65	2.81	NS	0.34	0.09	1.20
Married	0.04	0.60	0.01	NS	1.04	0.32	3.39
Female	−1.35	0.62	4.72	<.05	0.26	0.08	0.88
Some college or higher	−0.56	0.64	0.01	NS	0.94	0.27	3.28
Employed	0.95	0.62	2.35	NS	2.58	0.77	8.63
Clinic patient 2+ years	0.79	0.69	1.28	N.S.	2.19	0.56	8.52
Self-reported type 2 diabetes only	−1.78	0.60	8.63	<.01	0.17	0.05	0.55
Diabetes clinic patient	−1.38	0.64	4.59	<.05	0.25	0.07	0.89
High blood pressure	1.20	0.57	4.48	<.05	3.32	1.09	10.07
constant	4.43	2.19	4.08	<.05	83.80		
Model fit							
−2 log likelihood	88.45						
Nagelkerke χ^2	0.33						

Abbreviations: NS, not significant; SE, standard error; Sig, significance.

^aLogistic regression.

clinic. Having hypertension increased the likelihood of changing diet and/or physical activity to manage diabetes.

Discussion

This study examined self-reported diagnosis of type 1 and type 2 diabetes and lifestyle change among uninsured primary care patients utilizing a free clinic. There are 3 main findings. First, uninsured primary care patients may not know whether they have type 1 or type 2 diabetes. Second, participants who reported having type 2 diabetes only (based on perceptions) and/or were patients of the diabetes clinic had a low likelihood of modifying diet and/or physical activity to manage diabetes. This is in comparison with those with type 1 diabetes (based on perception) and or those who were not patients of the diabetes

clinic. Third, participants with hypertension were more likely to have changed diet and/or physical activity compared to those without hypertension.

The percentage of participants who reported type 1 diabetes looks too high in comparison with the national average and clinic records. In all, 95% of patients with diabetes nationwide have type 2 diabetes,¹ and the clinic has only several type 1 diabetic patients. Low health literacy may be one reason as to why so many patients self-identified as type 1 diabetics. Among free clinic patients, higher levels of health literacy are associated with better physical health.¹¹ Another study on female free clinic patients suggests that female free clinic patients who have higher levels of health literacy are more likely to have lower levels of negative perceptions of breast cancer and treatment.¹² Further research is necessary to

determine self-reported diagnoses of the 2 types of diabetes, including the relationship between health literacy and diabetes-related health behaviors.

The results on lifestyle change based on the regression analysis indicate that patients with type 2 diabetes only (based on perception) and/or patients of the diabetes clinic are not controlling their diabetes properly even if they receive comprehensive education on diabetes management. Free clinic patients expressed that they knew the importance of healthy diet and physical activity but had difficulties in changing their behaviors.¹³ More empathies on behavioral changes would be necessary to improve their lifestyle.¹³ The question of why patients with type 1 diabetes (based on perception) were more likely to change diet and/or physical activity than those with type 2 diabetes only (based on perception) still remains. Future qualitative studies may help to explore the context of misunderstanding the 2 types of diabetes and its impact on health behaviors and outcomes.

Participants who reported that they had hypertension were more likely to have changed diet and/or physical activity to manage diabetes compared to those who did not have hypertension. The combination of both hypertension and a diabetes diagnosis can lead to increased mortality and risk for macrovascular events, in comparison with either diagnosis alone.¹⁴ The medical severity of the 2 conditions combined may be 1 reason that patients with both conditions are more prone to behavior change. Another reason may be due to the pressure from a medical provider after receiving both diagnoses. A diabetes diagnosis in addition to a hypertension diagnosis can act as a catalyzing factor for an individual to begin exercising.¹⁵ Furthermore, patients with both diagnoses may check their blood glucose and feel inclined to check their blood pressure or reversed.

There are limitations in this study. This study was cross-sectional and did not determine causal relations among variables. Because the participants filled out the survey anonymously, there was no way to check the accuracy of their perceptions of having type 1 diabetes, type 2 diabetes, and/or hypertension. This study used a self-administered paper survey in English or Spanish and thus did not include patients who are not fluent in either English or Spanish language. As this is a pilot study, this article is not necessarily robust enough to generate any valid conclusions. Further research should be conducted to provide validity to the study results. However, these results are efficacious in creating a dialogue about diabetes diagnosis clarity, in order to improve patients' diabetes prevention and management strategies.

Conclusion

Uninsured primary care patients may not know whether they have type 1 or type 2 diabetes. This is a significant public health issue because type 1 and type 2 diabetes require different prevention and self-management strategies. In addition, patients who self-identify type 2 diabetes and/or who receive diabetes-focused care are not necessarily willing to change

their diet and/or physical activity to manage diabetes. Interestingly, patients with hypertension are more likely to change their lifestyle to manage diabetes than those without hypertension. This appears to be rational behavior and not a concern. It is a concern that patients in the diabetic clinic were less likely to change behavior. One reason for this lack of behavior change may be due to the fact that patients in the diabetes clinic are more complex or noncompliant. This can only be surmised, however, and not proven without further research.

Overall, these results have important implications for health promotion. Health educators should focus on providing clarity about diagnoses foremost, before teaching about disease management. Diagnosis clarity could help improve individual diabetes management strategies. Additionally, health promotion programs directed toward safety net clinic patients should focus on not only increasing the knowledge but also motivations since motivations impact diabetes self-management behaviors.¹⁶ For better understanding this group of people, action needs to be taken toward decreasing health disparities and increasing health equity for safety net clinic patients.

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Declaration of Conflicting Interests

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References

1. Center for Disease Control and Preventions. Adult Obesity Causes & Consequences. 2016. Available at: <https://www.cdc.gov/obesity/adult/causes.html>. Accessed January 5, 2017.
2. Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: US Department of Health and Human Services; 2014.
3. National Institute of Diabetes and Digestive and Kidney Diseases. *Your Guide to Diabetes: Type 1 and Type 2*. Bethesda, MD: National Institute of Health; 2013. Publication No. 14-4016.
4. Chimen M, Kennedy A, Nirantharakumar K, Pang TT, Andrews R, Narendran P. What are the health benefits of physical activity in type 1 diabetes mellitus? A literature review. *Diabetologia*. 2012;55(3):542-551. doi:10.1007/s00125-011-2403-2.

5. Yin HS, Jay M, Maness L, Zabar S, Kalet A. Health literacy: an educationally sensitive patient outcome. *J Gen Intern Med*. 2015; 30(9):1363-1368. doi:10.1007/s11606-015-3329-z.
6. Nichols GA, Mcburnie M, Paul L, et al. The high prevalence of diabetes in a large cohort of patients drawn from safety net clinics. *Prev Chronic Dis*. 2016;13:160056. doi: 10.5888/pcd13.160056.
7. Mayer VL, McDonough K, Seligman H, Mitra N, Long JA. Food insecurity, coping strategies and glucose control in low-income patients with diabetes. *Public Health Nutr*. 2016;19(6):1103-1111.
8. Food Research & Action Center. Why Low-Income and Food Insecure People are Vulnerable to Obesity. 2017. Available at: <http://frac.org/obesity-health/low-income-food-insecure-people-vulnerable-poor-nutrition-obesity>. Accessed January 5, 2017.
9. Rosenbaum S, Hall MA. *The Health Care Safety Net in a Post-Reform World*. New Brunswick, NJ: Rutgers University Press; 2012.
10. Center for Disease Control and Prevention. About Prediabetes & Type 2 Diabetes. 2016. Available at: <https://www.cdc.gov/diabetes/prevention/prediabetes-type2/index.html>. Accessed January 5, 2017.
11. Kamimura A, Christensen N, Tabler J, Ashby J, Olson LM. Patients utilizing a free clinic: physical and mental health, health literacy, and social support. *J Community Health*. 2013;38(4):716-723.
12. Kamimura A, Chernenko A, Nourian MM, Aguliera G, Assasnik N, Ashby J. The role of health literacy in reducing negative perceptions of breast health and treatment among uninsured primary care patients. *J Community Health*. 2016;41(4):858-863. doi:10.1007/s10900-016-0164-z.
13. Kamimura A, Ashby J, Trinh HN, et al. Uninsured free clinic patients' experience and perceptions of healthcare services and patient education. *Patient Exp J*. 2016;3(2):12-21.
14. Long AN, Dagogo-Jack S. Comorbidities of diabetes and hypertension: mechanisms and approach to target organ protection. *J Clin Hypertens (Greenwich)*. 2011;13(4):244-251. doi:10.1111/j.1751-7176.2011.00434.x.
15. Schneider KL, Andrews C, Hovey KM, et al. Change in physical activity after a diabetes diagnosis. *Med Sci Sports Exerc*. 2014; 46(1):84-91. doi:10.1249/mss.0b013e3182a33010.
16. Egede LE, Osborn CY. Role of motivation in the relationship between depression, self-care, and glycemic control in adults with type 2 diabetes. *Diabetes Educ*. 2010;36(2):276-283. doi:10.1177/0145721710361389.

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