Published in final edited form as:

Diabetes Educ. 2014 May ; 40(3): 319–328. doi:10.1177/0145721714524282.

The Prevalence and Correlates of Mental and Emotional Health Among American Indian Adults With Type 2 Diabetes

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Abstract

Aims—The purpose of this study was to examine the prevalence and correlates of mental and emotional health factors among a sample of American Indian (Indigenous) adults diagnosed with type 2 diabetes.

Methods—Data are from a community-based participatory research project involving two Indigenous reservation communities. Data were collected from 218 Indigenous adults diagnosed with type 2 diabetes via in-person paper-and-pencil survey interviews.

Results—Reports of greater numbers of mental/emotional health problems were associated with increases in self-reported hyperglycemia, comorbid health problems, and health-impaired physical activities.

Conclusions—This study addresses a gap in the literature by demonstrating the associations between various mental/emotional health factors and diabetes-related health problems for Indigenous Americans. Findings underscore the importance of holistic, integrated primary care models for more effective diabetes care.

Keywords

American Indian; Diabetes; Mental Health; Native American

Mental Health and Type 2 Diabetes among American Indian Adults

American Indians/Alaska Natives (hereafter “Indigenous”) are overall 2.1 times more likely than non-Hispanic Whites to have diabetes,[1] with the majority being diagnosed with Type 2 diabetes mellitus.[2] Indigenous people in the United States experienced a 58% increase in diabetes from 1990 – 1998; during that same time period, the general population diabetes incidence grew 9.1%.[2] This disparity persists even after controlling for age, gender, other risk factors, and lifestyle characteristics.[3]

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Simultaneously, there is evidence of disproportionate mental health problems for Indigenous people.[4,5] The effects of these disparities are demonstrated by mortality statistics: Indigenous Americans suffer strikingly disproportionate death rates due to alcoholism (552% higher), diabetes (182% higher), and depression (suicide, 74% higher) compared to causes of death for other racial/ethnic groups.[2] Yet, little published research has documented the overlapping and interactive effects of type 2 diabetes and mental health factors within Indigenous communities, even despite a significant body of literature investigating these topics in the general population. Given the complexity of diabetes care, understanding the overall impact and interplay of diabetes on holistic wellbeing (including mental/psychological health) is paramount. The purpose of this study is to describe the prevalence and correlates of several mental and emotional health factors among a sample of Indigenous adults diagnosed with type 2 diabetes.

In 2007, Tann, et al. asserted, “To date there have been few, if any, studies that have explored the relationship between diabetes and depression in American Indian/Alaska Native communities, other than to document that these two issues are of concern in these populations.”.[6, p. 3] The authors demonstrated that depressive symptoms were associated with greater odds of diabetes in a sample that included Indigenous people, who reported highest “poor mental health” compared to all other racial/ethnic groups in the study. Indigenous individuals had the highest rate of depression compared to African Americans and whites in a separate study of elders with diabetes, but these differences were not statistically significant.[7] Elsewhere, depression was significantly associated with a greater likelihood of diabetes among Indigenous participants after adjusting for socio-demographic characteristics and other diseases.[8] A study including White and Indigenous respondents found that those who reported at least two weeks of “not good” mental health were 48% more likely to be diagnosed with diabetes; the strength of this association was greater for Indigenous compared to White participants.[9] In addition, higher (but not statistically significant) depressive symptoms have been found among Indigenous people with diabetes compared to those without.[10-11]

In a review of the literature, only two published studies with one population were found that examined the impact of mental health on diabetes outcomes among Indigenous participants. Prior work with a Pima community in Arizona revealed higher glycosylated hemoglobin levels among depressed compared to non-depressed individuals with diabetes, leading the authors to conclude that treatments for depression may improve glycemic control.[10-11]

Evidence from an accumulation of studies with non-Indigenous participants has demonstrated robust links between mental health and diabetes as well as diabetes-related health outcomes and complications. Much of the prior work in this area has focused on depression specifically. A 2001 review concluded that adults with diabetes have twice the risk of experiencing depression,[12] and a multi-national study found that individuals with diabetes had 38% higher odds of being depressed than those without diabetes.[13] Depression among people who have diabetes has been associated with a variety of consequences including greater health care expenditures, emergency room visits, hospitalization, and poorer treatment adherence.[14–16] Activity impairment and decreased quality of life have been shown to be more likely among patients with diabetes and depression compared to

those with diabetes or depression alone.[17] Likewise, depression has been associated with a range of diabetes-related physical health complications including retinopathy, nephropathy, neuropathy, coronary artery disease, and sexual dysfunction.[18] Most alarming, individuals experiencing comorbid depression and diabetes have been found to be at higher risk of mortality than those with only diabetes or depression.[19]

Beyond depression, the lifetime prevalence ratio for anxiety may be as much as 20% higher for those with diabetes than those without.[20] A meta-analysis of clinical studies demonstrated that 14% of persons with diabetes also met criteria for generalized anxiety disorder, and 40% presented with elevated symptoms of anxiety.[21] Cohen and colleagues found that patients with a lifetime history of psychiatric illness showed significantly worse glycemic control compared to patients without a history of mental disorder.[22]

Affective/emotional statuses including apathy and anger have also been associated with poorer diabetes-related outcomes. Apathetic patients with diabetes may be less likely to adhere to their medication or exercise regimen and have higher Body Mass Indices (BMI).[23] Similarly, anger has been linked to worse glycemic control as measured by A1C,[24] and low levels of anger-control have been associated with higher glucose levels.[25]

In summary, few published studies examine the prevalence and consequences of comorbid mental health or emotional problems and diabetes in Indigenous communities and little is known regarding the outcomes of this comorbid milieu. More generally, prior conceptualization of mental health has focused largely on depression and/or anxiety, with less focus on emotional factors that may impact diabetes-related health outcomes.

Research Design and Methods

The Mino Giizhigad (A Good Day) Study is a community-based participatory research (CBPR) project with the Lac Courte Oreilles and Bois Forte Bands of Chippewa (although many members of this group prefer the term “Anishinabe” or “Ojibwe,” the term “Chippewa” has been used in relatively recent legal proceedings and is currently incorporated into a number of Band names[26]) and the University of Minnesota Medical School-Duluth. Both tribal communities consented to be named in public dissemination of research findings. CBPR is not a set methodology, but instead a theoretical orientation that changes the role of researcher and “researched,” such that research communities become *equal* participants (rather than passive subjects) in a mutually beneficial process.[27] CBPR strategies are of particular relevance for research with Indigenous people. Whether intentional or not, past research in Indigenous communities has, in some cases, resulted in harmful consequences including breeches in confidentiality, exploitation of families and communities, economic repercussions, and insensitivity to culturally specific perspectives and interpretations.[28] These issues, coupled by colonization and oppression experienced by Indigenous groups, no doubt create mistrust, fear, and skepticism to participate in research on the part of many Indigenous communities. Despite these problems, collaborative research that carefully considers the unique ethical situation presented by the history and sovereignty of Indigenous nations can be extremely successful and beneficial to both sides of the partnership.

Tribal resolutions from both communities were obtained prior to application submission for funding. The project began with community feasts and forums to discuss the study goals, obtain community feedback, and establish Community Research Councils (CRC). CRC and University team members were active participants in the entire research process, from methodological planning to final data collection and analysis. The University of Minnesota IRB and Indian Health Services National IRB reviewed and approved the methodology included in this study.

Sample

Potential participants were randomly selected from each reservation's health clinic records. Inclusion criteria were patients 18 years or older, type 2 diabetes diagnosis, and self-identified as American Indian. Clinic partners were trained on probability sampling methods to generate a random sample of 150 patients from their lists. Selected patients were mailed a welcome letter, an informational project brochure, and a contact information card with mail and phone-in options to decline participation. Trained community interviewers contacted non-declining recruits to schedule interviews. Consenting participants were given a pound of locally cultivated wild rice and a $30 cash incentive. Paper-and-pencil interviewer administered surveys were completed in participants' location of choice, most often in private spaces within homes. The time to complete each survey ranged between approximately 1.5 - 3 hours.

Identifying information linked to surveys was removed and replaced with an ID number by project coordinators prior to sending to the university-based team. Out of a total initial eligible sample of 289 individuals, 218 participants completed surveys for a study response rate of 75.4%.

Measures

Mental & Emotional Health—Four major mental and emotional constructs are included in these analyses. *Depressive Symptoms* were measured by scored responses (0 to 3, where 0 = not at all, 1 = several days, 2 = more than half the days, 3 = almost every day) to nine items (PHQ-9[29]) assessing symptoms of depression experienced in the two weeks prior to survey participation. The final summed score of all nine items included a possible range of 0 to 27 and had excellent reliability (Cronbach's α = .98). *Anxiety* was measured by responses to Beck Anxiety Inventory[30] items assessing degree of impact of 21 anxiety symptoms (0 = not at all, 1 = mildly, 2= moderately, and 3 = severely bothered). The summed value of all items was calculated for a total possible range of 0 to 63, with Cronbach's α= .95. *Anger* was measured with the Tri-Ethnic Anger scale,[31] including responses to 6 questions about frequency (most, some, or none of the time) of anger-related emotions (e.g., mad, feel like hitting someone, quick tempered). The mean response for all 6 items was calculated, and Cronbach's α= .78. *Apathy* was measured with responses to 8 items adapted from the Apathy Evaluation Scale.[32] Participants were asked to indicate frequency (from "not at all" to "a lot") during the 4 weeks prior to the interview of various thoughts, feelings, and activities indicating apathy (e.g., interest in new experiences, approaching life with intensity,

having motivation), with higher scores indicating a greater degree of apathy. Cronbach's α for the resulting summed index = .67.

Health Outcomes—All physical health outcomes were measured with items from the Michigan Diabetes Research and Training Center Diabetes Care Profile.[33] *Physical limitations* is a measure of health-impaired moderate activities like moving a table, pushing a vacuum, bowling, or playing golf (no limitation = 0, a little limitation = 1, a lot of limitation = 2). For ease of interpretation, a dichotomized version of the variable was used in cross tabulation tables (0 = none, a little, 1 = a lot). *Hyperglycemia* (high blood glucose) was assessed by the following question: How many days in the last month have you had high blood sugar with symptoms such as thirst, dry mouth and skin, increased sugar in the urine, less appetite, nausea, or fatigue? Responses were coded as 1 = 0 times; 2 = 1 – 3 times; 3 = 4 – 6 times; 4 = 7 – 12 times; and 5 = more than 12 times. A dichotomized version of this variable was used in cross tabulation tables (0 = none, 1 = any hyperglycemia). The last health outcome assessed was *comorbidities*, or reports of eye, heart/circulatory, bladder, kidney or urinary, or foot/leg problems. This measure is a count index of 21 potential comorbid conditions, thus resulting in a possible range in scores from 0 – 21.

Control Variables—Several control variables were also included. *Gender* was coded 0 = male, 1 = female. Although all participants in this study sought medical care at clinics located on reservation, some lived off reservation lands. This was controlled for this with a dummy variable where 0 = off reservation and 1 = on reservation. *Per capital household income* was measured by asking respondents to indicate their overall household income within $10,000 ranges. The final measure included the midpoints of these ranges divided by the number of people living within households. The *number of years the participant had diabetes* and self-reported *age* in years was also controlled for.

Results

Descriptive statistics, bivariate correlations (pearson's *r*), crosstabulations (χ^2 difference tests), and ordinary least squares (OLS) regression analyses with list-wise deletion of missing cases were generated to examine study variables. In the multivariate regression models, list-wise deletion resulted in a sample size of 201 valid cases from the overall sample size of 218.

Descriptive Statistics

Table 1 provides bivariate correlations and descriptive statistics for study variables. Participants were on average 57 years old, 56% were female, and about 78% lived on reservation lands. The mean per capita household income for this sample was $10,331, and participants reported an average duration of type 2 diabetes diagnoses of 15 years. Average PHQ-9 and Beck Anxiety Inventory (BAI) scores for this sample were 4.5 and 10.7, respectively. Using a criterion of PHQ-9 scores of 10 or higher, 17.1% of participants in this sample could be considered depressed. About 25% of the sample was moderately or severely anxious based on BAI scores between 16 – 25 for moderate anxiety (12.9%), and scores above 26 for severe anxiety (12%). At the bivariate level, depressive and anxiety symptoms

were significantly and positively associated with physical limitations, hyperglycemia, and comorbidities. Higher apathy scores were significantly correlated with greater physical limitations and hyperglycemia.

Table 2 further explores the relationships between various mental and emotional statuses and physical health outcomes. The columns within Table 2 indicate presence (yes) or absence (no) of depression (PHQ-9 score of 10 or higher), moderate or severe anxiety (BAI score of 16 or higher), anger above the sample average, and apathy scores above the sample average. Reading across the rows, those who met “yes” criteria for depression, anxiety, and apathy also reported significantly higher physical limitations (assessed in Table 2 as having “a lot” of limitations to moderate physical activities). Physical limitations were also higher among those with anger scores above the sample average, but this difference was not statistically significant. Participants who reported past month hyperglycemia were also significantly more likely to report depression and anxiety. Anger and apathy scores were higher for those who reported hyperglycemic experiences than those who did not, but these trends did not reach statistical significance. Moderate or severe anxiety scores were associated with a significantly higher number of comorbid health conditions (4.6 average comorbidities with above average anxiety vs. 3.7 below average; $p < .05$). Above average apathy was not associated with comorbidities at the .05 confidence level (4.2 vs. 3.6; $p < .10$).

Table 3 examines the potentially accumulative impact of multiple mental health/affective problems on associations with physical health problems. The numbers at the top of the table represent a count of mental/emotional health problems (apathy, anger, depression, and anxiety were operationalized as described for Table 2, above) from 0 to 4. As the count of negative emotional/affective states increased, the proportion of people reporting various physical health problems grew compared to those who did not ($p < .01$, $p < .05$, and $p < .10$ for physical limitations, hyperglycemia, and comorbidities, respectively). For instance, a majority of the people who reported all four of the affective/emotional problems measured also reported experiencing physical limitations (57.1%), hyperglycemia (85.7%), and comorbid conditions (85.7%). Alternatively, a minority of the sample who reported no (0) affective/emotional problems indicated experiencing these same physical health conditions.

The relative associations between mental/emotional factors and physical health problems net the effects of salient control variables are shown in a series of OLS regression models (Table 4). Each of the control variables and mental health measures were regressed on physical health outcomes.

Four separate regression models are shown for each health outcome. Every model includes control variables as predictors in addition to apathy (Model 1), anger (Model 2), anxiety (Model 3) and depressive symptoms (Model 4). Looking first at the control variables, age was significantly and positively associated with physical health limitations and comorbid conditions across all models. There was a robust and significant negative association between age and hyperglycemia and a similarly consistent positive association between hyperglycemia and the number of years a patient had diabetes.

After inclusion of all control variables, higher apathy scores were significantly and positively associated with health-impaired physical limitations (β = .20; p < .01), hyperglycemia (β = .24; p < .01), and comorbidities (β = .15; p < .05). Anger was positively associated with physical limitations, although the effect was not significant at the p < .05 level (β = .14; p < .10). Anxiety and depressive symptoms were each positively and significantly associated with all three of the included health outcomes (see Table 4). Adjusted R^2 statistics are included as a measure of the proportion of variance in health outcomes (dependent variables [DV]) explained by the independent variables. Adjusted R^2 values ranged from a low of 6% (Model 2, DV = health limitations) to a high of 19% (Model 3, DV = comorbidities).

Discussion

The purpose of this study was to examine associations between several mental/emotional health variables and diabetes-related health problems among a sample of Indigenous adults with type 2 diabetes. Although previous work provides evidence of disproportionate diabetes and mental health problems among the Indigenous peoples of North America in general (e.g.,[1,5]), these findings begin to explore in more detail the intersections of diabetes and mental/emotional health for this population.

Overall, 17.1% of study participants met criteria for depression based on a PHQ-9 cutoff score of 10 or higher. This rate is higher than that reported in a separate study of Indigenous adults with type 2 diabetes (12.8%,[10]) but on par with another (17 – 20%,[11]). In addition, about 25% of our study participants reported moderate to severe anxiety. This compares to a much lower rate found in other populations with type 1 and/or 2 diabetes: In prior work, 5% of individuals with type 1 diabetes in the United States and 17% in the United Kingdom reported moderate to severe anxiety.[34] Other studies using the Hospital Anxiety and Depression Scale have reported rates of moderate to severe anxiety ranging from approximately 15 -18%.[35,36] Diabetes educators and other health providers should be cognizant of this disparity.

The bivariate tables (1, 2 & 3) demonstrate several significant associations between mental (depressive and anxiety symptoms) and emotional (anger and apathy) factors and several physical health problems including comorbid health conditions, health-impaired activities, and hyperglycemia. The significance of associations between three mental health constructs (apathy, depressive symptoms, and anxiety symptoms) and health outcomes was robust even after controlling for a number of factors such as age, gender, income, and number of years with diabetes.

The results demonstrate that for Indigenous people in this study, diabetes-related physical health problems are positively associated with multiple mental and emotional health problems. In addition, the more mental health problems an individual in this study had, the more likely they were to report physical health complications, suggesting an accumulating disadvantage for those experiencing multiple mental and emotional health issues. Similar to conclusions drawn by others, [10] these findings suggest that mental health treatment for patients with diabetes may also promote physical health.

Diabetes educators should consider the potential impact of mental health for their patients' disease management and general health outcomes. Screening patients for mental health conditions and referring for appropriate treatment has the potential to improve care. For example, in a study of older adults with diabetes, depression care management improved depressive symptoms, overall functioning, and weekly exercise days compared to those who had not received the service.[37] Using the same intervention, individuals receiving depression care management experienced significantly more depression-free days than individuals who did not receive this service.[38] Further supporting the integration of mental health evaluation in diabetes care, Bogner et al.,[39] reported that depressed patients with diabetes randomized to clinics offering depression care management were less likely to die than those randomized to usual care clinics over a 5-year period. Studies evaluating the use of both antidepressants and cognitive behavioral therapy strategies have illustrated that improvements in depressive symptoms and anxiety are related to better glycemic control (e.g., [40,41]). The evaluation of mental health by diabetes educators is in line with current guidelines and standards that encourage the assessment of mental health status and suggest that psychosocial problems and chronic illnesses like depression pose a mountable barrier to self-care (e.g., American Association of Diabetes Educators).[42-44] This work further highlights the importance of the mental health assessment as an integral part of diabetes care.

The results of this study should be interpreted with appropriate caution. The design was cross-sectional, thus prohibiting conclusions regarding temporal ordering between physical and mental health problems for this sample. The sample was drawn from a clinic sampling frame of patients who sought care at reservation-based clinics. Findings cannot be generalized to Indigenous people who did not seek treatment for their diabetes, those who have type 2 diabetes but have not been diagnosed, or those who received care solely at off-reservation facilities. Much has been written about tribal diversity across over 560 federally recognized groups within the U.S. including documented ranges in diabetes prevalence from 5.5% for Alaska Natives to 33.5% for Indigenous adults in Arizona.[45] Further work within other cultural groups may be needed to better understand the prevalence and correlates of mental health across cultures.

To reiterate, the findings of this study demonstrate that the Indigenous participants reported elevated rates of depressive and anxious symptoms compared to reports from prior research with other populations, and that each of these mental health problems as well as emotive factors like apathy and anger are associated with physical health complications. Currently, the Special Diabetes Program for Indians (SPDI) provides diabetes treatment and prevention programming to Indigenous people. Although this programming includes a practitioner's guide for dealing with depression and diabetes, most of the SPDI programs focus on physical health, diabetes education, and prevention.[46] Depression, although important, was not the only aspect of mental and emotional health relevant to health outcomes in this study. Future work should continue to broaden the conceptualization of mental/emotional pain not just for Indigenous Americans, but also for patients with diabetes in general.

Drawing from generalized Indigenous health framework models,[47] mental and physical health may be inexplicably intertwined with direct implications for diabetes care. Prior work suggests perceived stigma surrounding isolated mental health treatment among some

Indigenous groups.[48] Hence, primary care settings that provide physical *and* mental health services may be useful for improving diabetes health outcomes. One effective model is integrated primary care, in which an interdisciplinary team treats each patient holistically. This method may be culturally congruent for many Indigenous groups who endorse a holistic cultural health belief and are hesitant to receive mental health services.[47] A priority of the health care team should be providing holistic and culturally appropriate care to patients. Further, the results of this study support broadened conceptions of mental/emotional health and subsequent impact on diabetes-related outcomes.

Acknowledgements

The Mino Giizhigad Team includes Community Research Council members: Doris Isham, Julie Yaekel-Black Elk, Tracy Martin, Sidnee Kellar, Robert Miller, Geraldine Whitement, Peggy Connor, Michael Connor, Stan Day, Pam Hughes, Jane Villebrun, Muriel Deegan, Beverly Steel, and Ray Villebrun. The authors respectfully acknowledge the commitment and participation of project team members in addition to their thoughtful review of this manuscript.

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Funding: Research reported in this paper was supported by the National Institute of Mental Health under Award Number MH085852 (M. Walls, Principal Investigator). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Table 1

Bivariate Correlations and Descriptive Statistics for All Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender (Female = 1)	1												
2. On reservation	.04	1											
3. # Years Diabetic	.09	.14*	1										
4. Per Cap HH Income	.00	−.19**	.03	1									
5. Age	.12	.001	.33***	.08	1								
6. Location	.00	−.30***	.00	.05	−.05	1							
7. Apathy	−.10	.11	.04	−.16*	.06	−.19**	1						
8. Anger	.00	.04	.00	−.16*	−.30***	−.05	.15*	1					
9. Anxiety	.16*	.06	−.04	−.07	−.21**	−.07	.14	.46***	1				
10. Depressive Symptoms	.08	−.07	−.03	−.16*	−.21**	.07	.28***	.40***	.56***	1			
11 Physical Limitations	.08	−.08	.12	−.12	.16*	−.03	.19**	.10	.31***	.29***	1		
12. Hyperglycemia, past mo.	.01	.10	.10	.02	−.25***	.03	.20**	.12	.30***	.33***	.22**	1	
13. Comorbidities	.08	−.06	.16*	.03	.32***	.11	.10	−.04	.18**	.13*	.33***	.11	1
Mean/% (s.d.)	56%	78%	14.7 (12.2)	10,331 (9,365)	56.5 (13.7)	54%	7.5 (4.0)	.54 (.34)	10.7 (12.6)	4.5 (5.5)	.52 (.74)	2.1 (1.3)	3.9 (2.5)

* < .05

** < .01

*** < .001

Table 2

Mental & Emotional Health Problems by Physical Health Status

	Depressive Symptoms		Anxiety		Above Ave Anger		Above Ave Apathy	
	No	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Physical Limitations	11.7%	29.7%**	10.8%	30.8%**	15.0%	17.3%	8.9%	21.2%*
High Blood Sugar, past mo	49.2%	75.0%**	49.4%	71.4%**	51.2%	60.8%	49.1%	58.3%
Comorbidities[a]	3.9 (2.5)	4.3 (2.7)	3.7 (2.4)	4.6 (2.8)*	3.9 (2.7)	3.9 (2.3)	3.6 (2.5)	4.2 (2.6)†

[a]Average # of comorbidites

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Table 3

Percent/(Count) of Health Problems within Accumulating Negative Affective/Emotional Statuses

Count of Negative Mental/Emotional States:	0	1	2	3	4
Physical Health Problems:					
Physical Limitations[a]	8.8% (6)	10.4% (7)	16.3% (8)	29.6% (8)	57.1% (4)
Hyperglycemia, Past Month[b]	44.8% (30)	44.8% (30)	66% (31)	69.2% (18)	85.7% (6)
Above Average Comorbidities[c]	38.2% (26)	43.3% (29)	55.1%(27)	44.4% (12)	85.7% (6)

[a] $\chi^2 = 17.340$, $df = 4$, $p < .01$

[b] $\chi^2 = 12.541$, $df = 4$, $p < .05$

[c] $\chi 2 = 7.957$, df=4, p = .09

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Table 4

Results of OLS Regression Analysis

Physical Limitations (Moderate Activities)								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Constant	.01(.28)		−.11(.31)		−.22(.27)		−.10(.27)	
Gender (Female = 1)	.11(.10)	.08	.05(.10)	.03	−.04(.10)	−.02	.04(.10)	.03
On reservation	−.26(.12)	−.15*	−.20(.13)	−.11	−.22(.13)	−.13	−.20(.12)	−.12
# Years Diabetic	.00(.00)	.07	.01(.01)	.08	.01(.00)	.08	.00(.00)	.06
Per Cap HH Income	−.01(.01)	−.11	−.01(.01)	−.14†	−.01(.01)	−.15*	−.01(.01)	−.10
Age	.01(.00)	.13	.01(.00)	.21**	.01(.00)	.25**	.01(.00)	.21**
Location	−.04(.10)	−.03	−.03(.11)	−.02	−.01(.10)	−.01	−.11(.10)	−.08
Apathy	.04(.01)	.20**						
Anger			.30(.16)	.14†				
Anxiety					.02(.00)	.34***		
Depressive Symptoms							.04 (.01)	.30***
Adjusted R^2	.07		.06		.15		.12	

Hyperglycemia, past month								
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Constant	2.4(.47)		2.9(.54)		2.41(.46)		2.33(.46)	
Gender (Female = 1)	.12(.17)	.05	.02(.18)	.01	−.11(.18)	−.04	−.03(.17)	−.01
On reservation	.27(.21)	.09	.39(.23)	.12	.38(.22)	.12	.39(.21)	.13
# Years Diabetic	.02(.01)	.18*	.02(.01)	.21**	.02(.01)	.21**	.02(.01)	.16*
Per Cap HH Income	.01(.01)	.10	.01(.01)	.06	.01(.01)	.07	.01(.01)	.10
Age	−.03(.01)	−.33***	−.03(.01)	−.31***	−.02(.01)	−.25**	−.02(.01)	−.24**
Location	.22(.18)	.08	.13(.19)	.05	.17(.18)	.07	.07(.17)	.03
Apathy	.08(.02)	.24**						
Anger			.11(.28)	.03				
Anxiety					.03(.01)	.26***		
Depressive Symptoms							.07(.02)	.30***
Adjusted R^2	.13		.09		.15		.16	

Comorbid Health Conditions								
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Constant	−.60(.93)		−.60(1.03)		−1.30(.89)		−.85(.90)	
Gender (Female = 1)	.37(.33)	.07	.15(.34)	.03	−.05(.34)	−.01	.18(.33)	.04
On reservation	−.26(.42)	−.04	.01(.44)	.00	−.15(.42)	−.02	−.10(.42)	−.02

Comorbid Health Conditions								
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
# Years Diabetic	.01(.01)	.04	.01(.02)	.04	.01(.01)	.03	.01(.01)	.03
Per Cap HH Income	.00(.01)	.02	−.01(.02)	−.05	−.01(.02)	−.05	.01(.02)	.02
Age	.06(.01)	.32***	.07(.01)	.37***	.08(.01)	.42***	.07(.01)	.37***
Location	.60(.35)	.12	.57(.35)	.11	.66(.34)	.13	.42(.34)	.08
Apathy	.10(.04)	.15*						
Anger			.48(.53)	.06				
Anxiety					.06(.01)	.28***		
Depressive Symptoms							.10 (.03)	.21**
Adjusted R^2	.12		.12		.19		.14	

* p < .05

** p < .01

*** p < .001

† p = .06