

## **Title: Depression and Diabetes: Determining the Coexistence in Primary Care**

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### **Abstract**

The goal of this study was to determine if diabetic patients in a community health center have significantly higher PHQ scores than their non-diabetic counterparts. If these patients did have higher depression scores, I wanted to know if they would show improvement as indicated by a lower PHQ score after educational intervention. A total of 63 patients, comprised largely of African-Americans, from Matthew Walker Comprehensive Health Center were surveyed and interviewed, 37 diabetic and 26 non-diabetic patients. To screen for depressive symptoms, both diabetic and non-diabetic patients were administered the Patient Health Questionnaire-9 (PHQ-9). The diabetic patients were given additional educational material and exercise suggestions to encourage physical activity. Additionally, these patients' blood pressures, body mass indices, weights, total cholesterol levels, fasting blood glucose levels, and their comorbidities were extracted from their charts to determine if these factors influenced their PHQ scores. Four weeks following the initial visit, follow-up interviews were held, during which the PHQ was re-administered. The *Online Stats Calculator* was used to analyze data. None of the aforementioned factors seemed to influence the diabetics' PHQ scores. Diabetic and non-diabetic patients' PHQ scores did not significantly differ from one another at the time of the initial interview. After one month, however, the difference between the average PHQ scores was significantly different between the two groups ( $p=0.03$ ), with the diabetics' average score being significantly lower than non-diabetics'. None of the factors normally associated with increasing risk for diabetes (i.e., blood pressure, BMI, weight, blood glucose) seemed to significantly affect the diabetics' PHQ scores. Male non-diabetics did, however, have significantly higher PHQ scores than the female non-diabetics ( $p=0.0045$ ). Taken together, these data suggest that the educational intervention may prove effective in helping the diabetic patients manage their depressive symptoms. Additionally, the multidrug therapy that the diabetics undergo may be effectively managing their mental status. Eight weeks was not long enough to monitor changes in glycated hemoglobin levels or other factors normally affected by diabetes. This research should therefore be continued to adequately monitor and provide effective care for the Matthew Walker patient population.

**Keywords: educational intervention; depression; PHQ-9; diabetes; multidrug therapy**

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## **Introduction**

As a Neuroscience major at my undergraduate institution, I have always been intrigued by how our mental status can positively and negatively affect our physical health. The reciprocal connections that our brain has with our body ultimately influence how we behave. Therefore, our mental health affects our overall wellbeing and vice versa. This has been a difficult concept for many laymen and even physicians to grasp, however. In an effort to highlight the idea that mental and physical health influence each other and to show that having a chronic disorder can affect individuals' mental health, I wanted to determine whether or not depression is a significant issue within Matthew Walker's diabetic patient population.

Matthew Walker Comprehensive Health Center is a health facility that has three locations within the Nashville area. The downtown Nashville site serves over 800 diabetic patients, the large majority of whom are African-American and Hispanic. With depression being one of the comorbidities associated with diabetes and one that disproportionately affects the African-American and Hispanic populations, I wanted to bring awareness to the adult medicine physicians at Matthew Walker by determining if, in fact, some members of the diabetic population at Matthew Walker also suffer from depression.

Therefore, I decided to distribute the Patient Health Questionnaire-9 (PHQ-9) to both diabetic and non-diabetic patients who visited Matthew Walker in an effort to determine if mental health screenings need to be incorporated into the comprehensive care that these patients receive.

## **Background**

Diabetes mellitus is of growing concern in the United States. An increasingly large number of individuals are diagnosed with this potentially debilitating disease annually, with

African American and Latino populations being disproportionately affected (Kissela et al, 2005). Of most concern is the growing number of individuals who are either prediabetic or who have diabetes and are unaware. This poses a great risk to these individuals' health and, therefore, to the quality of their lives. Increasing their access to health care, and more specifically to diabetes prevention, that includes giving them the fundamental knowledge about this disease, can significantly impact these individuals' health by reducing their blood glucose levels, their risk of comorbidities, and, ultimately, their quality of life.

The rate at which diabetes is diagnosed is steadily and scarily on the rise. A growing population of children is being diagnosed with this disorder annually; approximately 15,000 people under the age of 20 are found to have type 1 diabetes each year (Go et al, 2014), and a staggering 87.3 million people suffer with prediabetes (Go et al, 2014). What is more, this disease hardly strikes alone; many times, diabetics suffer with a number of comorbidities. For example, Kissela et al (2005) found that although African-Americans are more likely to have diabetes and have it at a younger age, Caucasians and African-American diabetics are more likely to have hypertension in addition to diabetes, and both have an increased likelihood of suffering from a diabetes-associated stroke (Kissela et al, 2005).

Diabetics' increased risk of cardiovascular events is also associated with the likelihood of developing many more comorbidities. An additional yet commonly unacknowledged disorder with which diabetics suffer is depression. There is a significant association between hyperglycemia and depression (Lustman et al 2000), with type 1 and type 2 diabetics having increased odds of suffering from depression overall (Anderson et al 2001). Some estimates postulate that diabetics are twice as likely as their non-diabetic counterparts to suffer from depression (Anderson et al 2001). Without other comorbidities being considered, approximately

350 million people suffer from depression worldwide (Marcus et al, 2012). Compounded with a chronic disorder such as diabetes, depression is another disorder that needs to be acknowledged and treated by physicians that regularly manage diabetics' care. Many physicians do not treat diabetics for depression, however. Two out of every three cases of depression go untreated by physicians (Lustman et al, 1987). In a survey of cardiologists, approximately 50% of them did not identify depression as a cardiac risk factor (Feinstein et al, 2006). Seventy-nine percent of the cardiologists used no standard method to diagnose depression (Feinstein et al, 2006).

To help reduce the number of individuals affected by this disorder, preventative measures must be taken such as practicing exercise and weight management and implementing healthy eating habits. There is promise in implementing diabetes education and prevention programs and lifestyle interventions to assist prediabetic and diabetic patients with managing their weight and eating habits. This effectively lowers these patients' blood glucose levels and risk of comorbidities as well (Larsen et al, 2011; Coles et al, 2014). Evidence suggests that lifestyle intervention programs, whether led by health officials or by the patient themselves, can significantly decrease fasting plasma glucose levels (Ma et al, 2013). Only the interventions led by health officials caused a decrease in diastolic blood pressure and triglyceride to high-density lipoprotein ratio, common diabetes associated comorbidities (Ma et al, 2013). Lifestyle interventions also more significantly decrease the risk of comorbidities such as depression that exist along with type 2 diabetes specifically (Wadden 2014).

It is my goal to expound on this research by providing diabetic education in an attempt to not only replicate previous findings, but also to broaden the impact that the results will potentially have. Specifically, I will counsel diabetic patients on how to manage their diabetes, the complications of the disorder, and the risk of acquiring comorbidities. If we are able to

successfully show that the frequency of depressive symptoms can be lowered by implementing lifestyle changes such as exercise and healthy eating, the prevalence of patients' comorbidities will, in turn, decrease. Thus, underserved members of the minority communities will be healthier, more prone to seek medical assistance, and produce healthier generations of children. Using education counseling as the primary platform to raise awareness about the risk factors and comorbidities associated with diabetes, I hypothesize that having diabetic patients participate in educational intervention will significantly decrease the patients' depression rating after one month.

Of greater importance is this study's ability to effectively persuade patients to become more proactive in managing their own health. While evidence shows that exercise does decrease the comorbidities associated with diabetes, specifically depression (Korytkowski et al, 2013; Ma et al, 2013), there is little evidence that bolsters the idea that education alone is enough to improve depressive symptoms. Therefore, our research will focus on attempting to give patients more autonomy in their care with the hopes that seeing positive results during follow-up will encourage long-term adherence to a nutrition and exercise regimen. Significantly reduced depression scores at this study's conclusion could spearhead more autonomous patient care in other health disciplines.

## **Methodology**

### *Population*

A total of 63 patients, comprised largely of African-Americans, from Matthew Walker Comprehensive Health Center were surveyed and interviewed, 37 diabetic and 26 non-diabetic patients.

### *Patient Health Questionnaire-9*

The Patient Health Questionnaire-9 (PHQ) was distributed to adult diabetic and non-diabetic patients who visited the clinic (Appendix). This nine-question survey asked the patients to identify the approximate number of days per week that they experience hallmark symptoms of depression. The tenth comprehensive question asked the patient to identify how the symptoms affect their lives overall. The patients were asked to complete the survey while they waited to see the adult medicine provider. Diabetic patients were also given educational information that explained the molecular basis of diabetes, how to effectively manage diabetes with exercise and healthy food choices, how to incorporate exercise into their everyday lives, and how to properly read nutrition labels (Appendix). The educational information was administered in open dialogue with the patient; I read through the material with each patient and allowed them to ask questions when necessary.

### *Data collection*

The patients' blood pressures from the past year, along with their glycated hemoglobin levels, fasting blood glucose readings, weights, triglyceride levels, and the number of comorbidities were all extracted from their charts. Their information was then de-identified to protect their privacy. This data was compared to the same data retrieved from the non-diabetic patients and compared using the Online Stats Calculator and Microsoft Excel.

### *Follow-up*

Both diabetic and non-diabetic patients were called one month after their visit to the clinic to determine if their PHQ score changed as a result of their consultation with the student.

## **Results**

A total of 63 patients were surveyed, 37 diabetics and 26 non-diabetics. A total of 33 females and 30 males were surveyed.

Diabetic patients had significantly higher blood glucose levels than the non-diabetics ( $t=3.82$ ,  $p<0.0004$ ). Diabetic patients also had significantly more comorbidities than non-diabetics patients ( $t=4.17$ ,  $p=0.0001$ ). Non-diabetics had significantly higher HDL levels than the diabetic patients ( $t=-2.63$ ,  $p=0.01$ ).

There was no significant difference between the PHQ scores of diabetics and non-diabetics. Similarly, the subset of diabetics with glycated hemoglobin values above seven and with diastolic blood pressures above 80mmHg did not have PHQ scores that differed significantly from those of the non-diabetics. Diabetics who were overweight, obese, and had higher than normal cholesterol values did not have PHQ scores that were significantly different from the PHQ scores of non-diabetics. However, there was a significant difference between the average PHQ score of male and female non-diabetics, such that the male non-diabetics had a significantly higher PHQ score than the female non-diabetics ( $t=-3.13$ ,  $p=0.0045$ ). Lastly, the diabetic patients' average PHQ was significantly lower than the non-diabetics' at the one-month follow-up ( $p=0.03$ ).

## **Discussion**

As expected, the diabetics that were surveyed had significantly more comorbidities than their non-diabetic counterparts. Additionally, the diabetic patients had significantly lower HDL levels than non-diabetics, indicating their increased risk for cardiovascular events compared to non-diabetics. The most unexpected finding was that diabetics' average PHQ score did not differ significantly from that of the non-diabetics at the time of the initial interview. In fact, the average

PHQ score of the non-diabetics was slightly higher than the diabetics' average score. This was a surprising finding given that depression is one of the many comorbidities associated with diabetes. However, this finding could be explained by the idea that the diabetic patients all take multiple medications that help manage their glycemic index. Taking multiple medications in an effort to establish and maintain glycemic control has been shown to positively impact cognitive function and mental stability (Abbetacola et al, 2010; Ryan et al, 2006 ). The diabetic patients could be experiencing the positive effects of multi-drug therapy. In this regard, Matthew Walker's physicians seem to be doing an excellent job at managing the care of the diabetic population.

Most importantly, the diabetic patients who could be reached for follow up showed a significant decrease in their PHQ scores overall, showing that education intervention may have been helpful in managing their depressive symptoms. These data suggest that education intervention should be incorporated into the care that patients receive at community health centers. Instead of providers simply treating patients with medications, they should first employ preventative measures by providing comprehensive and extensive education concerning risk factors and illnesses. This can prove beneficial to the patient by encouraging more proactive behavior and potentially preventing the patient's acquisition of certain illnesses.

Several questions were raised as a result of this research. Most importantly, I wanted to know if, with their increased risk of depression, diabetics at Matthew Walker are screened and treated for depression in addition to their treatment for diabetes. More broadly, how do the primary care physicians at Matthew Walker determine the mental health care needs of their adult population seeing that there is no psychiatrist or individual trained in mental health on site? I discovered that none of the patients that visit the clinic is screened for depression prior to seeing

the family medicine physicians. None of the patients was asked about their mental health status when they saw the physician or was told about their risk for depression. I, along with several of the other PCLP scholars left copies of the education information and surveys in an effort to encourage the physicians and medical assistants to consider talking to patients more about their mental and physical health. A new licensed clinical social worker has been hired to work in the clinic, which will be beneficial to those patients who are clinically depressed and cannot afford to see a psychiatrist.

Additionally, of interest to note is the finding that in nearly all of the analyses comparing diabetics to non-diabetics, the non-diabetics' PHQ scores tended to be slightly higher than the diabetic patients' scores. Specifically, male non-diabetics had significantly higher PHQ scores than females. Presumably, because the non-diabetic patients had significantly fewer comorbidities than the diabetics, they would experience fewer depressive symptoms. Many of the non-diabetics suffered from hypertension either principally or as a comorbidity, however. Hypertension is a risk factor associated with depression, and significantly affects men (Nabi et al, 2011), which could explain why men were more likely than females to experience depressive symptoms.

Finally, though not significant, there were trends in the data that approached significance. The average PHQ score of obese non-diabetic patients was almost significantly higher than the average PHQ score of the overweight non-diabetic patients. Additionally, non-diabetics with triglyceride levels above 150 mg/dL was nearly significantly higher than the average PHQ score of non-diabetics with triglyceride levels below 150 mg/dL. Lastly, males in both the diabetic and non-diabetic groups were more likely to have higher diastolic blood pressures than females. Taken together, these data suggest that there may be a tendency for hypertensive patients and

males to exhibit depressive symptoms as their weight increases. Therefore, this study should be continued in order to effectively and accurately assess the mental status of the patients that the clinic serves.

### **Recommendations**

The Family and Preventative Medicine physicians are doing an excellent job at effectively managing the medications that both their diabetic and non-diabetic patients are currently taking. The vast majority of the patients had never talked about their mental health status with any of the physicians, however, because the clinic does not distribute the PHQ-9 to its patient population. Therefore, I recommend that Matthew Walker begin to distribute this questionnaire at all three locations. This will not only reduce the stigma that is associated with mental illness, but will also facilitate dialogue between the patients and the physicians about the patients' mental health. When patients see that distributing the PHQ-9 is a standard practice at Matthew Walker, they will be more apt to discuss any depressive symptoms that they may be experiencing with the physicians and therefore be able to receive more comprehensive care.

Additionally, it is important that the physicians begin to provide the diabetic patients with more educational information and discuss the risks associated with this metabolic disorder with the diabetic population. The vast majority of the patients that I interviewed said that the physician who diagnosed them with diabetes did not provide educational material or discuss meal and exercise plans with them at the time of their diagnosis. This is critical to having the patients effectively manage their diabetes, as research has shown that diabetics who understand the risks associated with diabetes, track the foods they consume, and exercise regularly

significantly lower their glycated hemoglobin levels, their weight, and see favorable changes in their depression scores (Korytkowski et al, 2013).

Lastly, we must increase providers' awareness of depression as a common comorbidity among diabetics. Presumably, because providers view diabetes as a manageable disease, they do not assume that diabetics will suffer with depression. Informing providers about the statistics will allow them to better serve their patients, however. Treating patients for depression can help lower their glycated hemoglobin levels, their weight, and fasting glucose levels (Potter van Loon et al, 1992). Additionally, treating patients for depression has been shown to increase glucose uptake in non-insulin dependent diabetics. Therefore, if the providers address instead of overlook diabetic individuals' depressive symptoms, they could inadvertently manage patients' diabetes. This could improve the patients' overall quality of life.

### **Conclusion**

Diabetes is becoming one of the world's most prevalent chronic disorders, especially in communities where the population is largely overweight and/or obese. Matthew Walker serves this type of community: one in which individuals suffer with weight management issues and limited access to health care. Specifically, the Nashville site serves more than 800 diabetic patients. Therefore, it is imperative that the physicians become familiar with the comorbidities that affect this population. The physicians seem to be doing an excellent job at managing these patients' care thus far, as noted by the seemingly low rate of depression and high adherence rate to medications by the diabetics at Matthew Walker. I suggest that physicians now reach out to non-diabetic patients, including adolescents, to make sure that they are screened and properly treated for depression. Additionally, Matthew Walker could create exercise classes that are

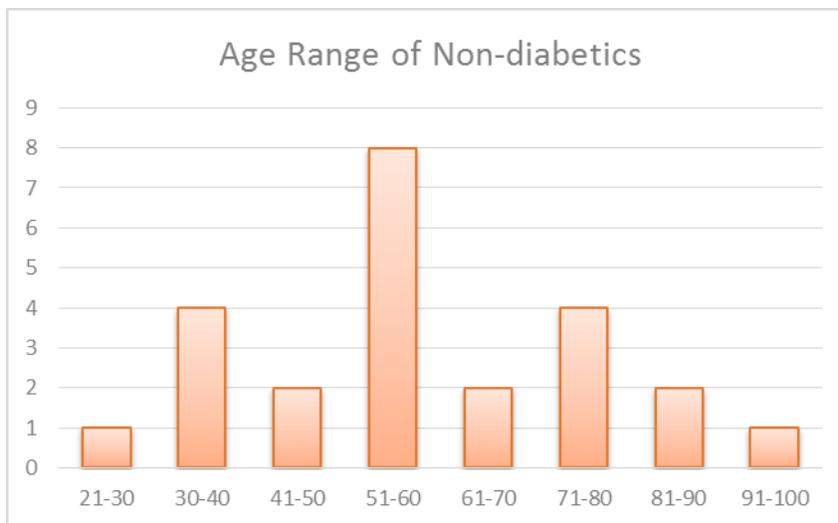
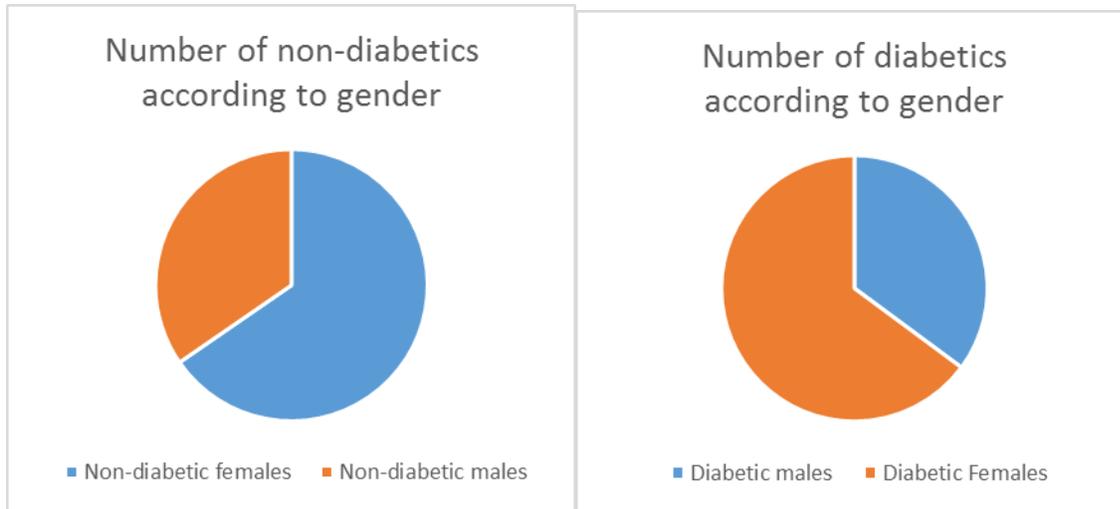
available to all patients, as regular exercise has been shown to decrease depressive symptoms (Korytkowski et al, 2013).

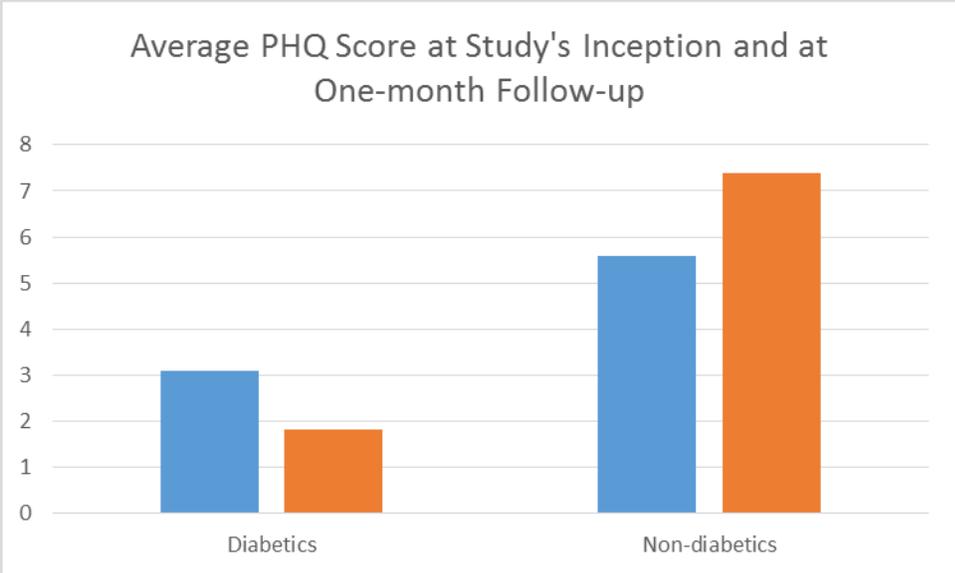
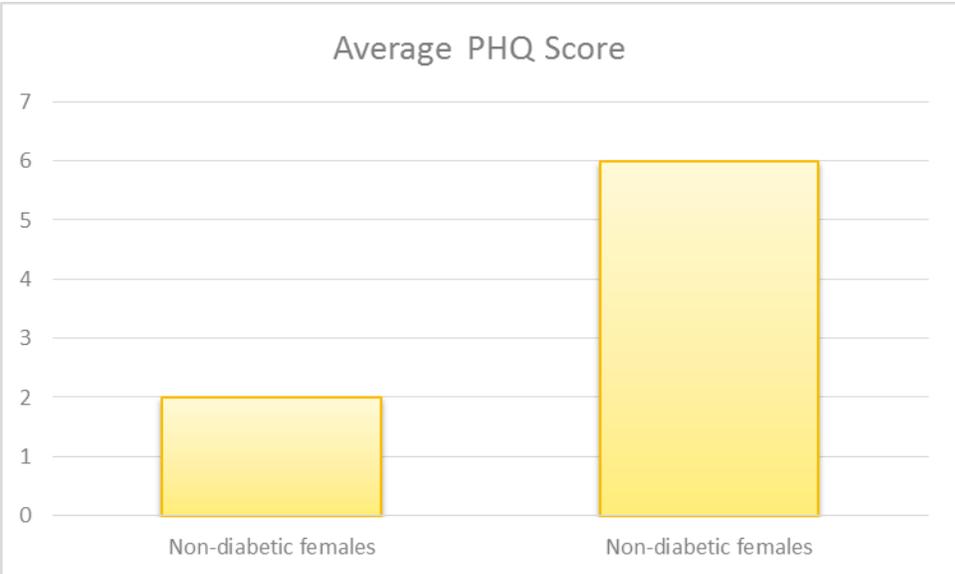
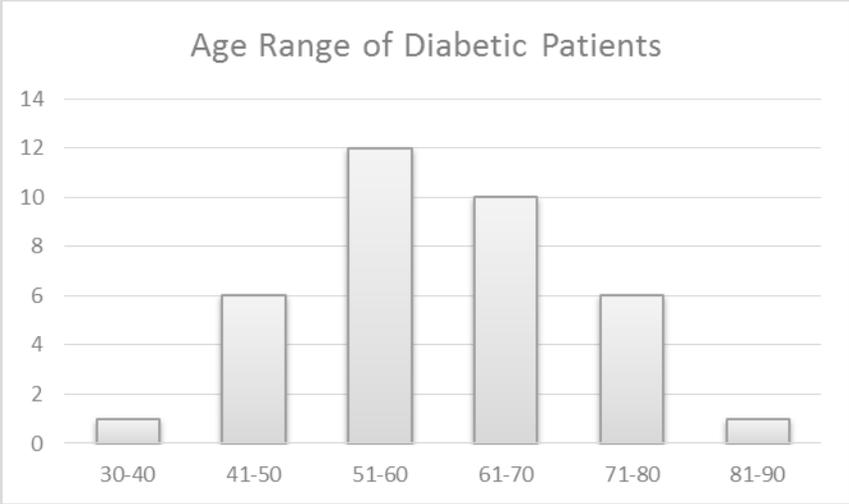
## References

- Abbatecola, AM, Lattanzio, F, Molinari, A, Cioffi, M, Mansi, L, Rambaldi, P, DiCioccio, L, Cacciapuoti, F, Canonico, R, Paolisso, G, Rosigliatazone and cognitive stability in older individuals with type 2 diabetes and mild cognitive impairment. *Diabetes Care* 33: 1706-1711, 2010.
- Anderson, R, Clouse, R, Freedland, K, Lustman, P: The prevalence of comorbid depression in adults with diabetes. *Diabetes Care* 24: 1069-1078, 2001.
- Coles, LT, Fletcher, EA, Galbraith, Clifton, P: Patient freedom to choose a weight loss diet in the treatment of overweight and obesity: a randomized dietary intervention in type 2 diabetes and pre-diabetes. *International Journal of Behavioral Nutrition and Physical Activity* 11:64, 2014.
- Feinstein, RE, Blumenfield, M, Orlowski, B, Frishman, WH, Ovanessian, S: A national survey of cardiovascular physicians' beliefs and clinical care practices when diagnosing and treating depression in patients with cardiovascular disease (Abstract). *Cardiology Review* 14(4): 164-169, 2006.
- Go, A, Mozaffarian, D, Roger, V, Benjamin, E, Berry, J, Blaha, M, Dai, S, Ford, E, Fox, C, Franco, S, Fullerton, H, Gillespie, C, Hailpern, S, Heit, J, Howard, V, Huffman, M, Judd, S, Kissela, B, Kittner, S, Lackland, D, Lichtman, J, Lisabeth, L, Mackey, R, Magid, D, Marcus, G, Marelli, A, Matchar, D, McGuire, D, Mohler, E, Moy, C, Mussolino, M, Neumar, R, Nichol, G, Pandey, D, Paynter, N, Reeves, M, Sorlie, P, Stein, J, Towfighi, A, Turan, T, Virani, S, Wong, N, Woo, D, Turner, M, on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2014 update: a report from the American Heart Association. *Circulation* 129: e28-e292, 2014.
- Guo, M, Mi, J, Jiang, QM, Xu, JM, Tang, YY, Tian, G, Wang, B, Metformin may produce antidepressant effects through improvement of cognitive function among depressed patients with diabetes mellitus (Abstract). *Clinical and experimental pharmacology and physiology* 2014
- Kissela, B, Khoury, J, Kleindorfer, D, Woo, D, Schneider, A, Alwell, K, Miller, R, Ewing, I, Moomaw, C, Szaflarski, J, Gebel, J, Shukla, R, Broderick, J: Epidemiology of ischemic stroke in patients with diabetes: The Greater Cincinnati/Northern Kentucky Stroke Study. *Diabetes Care* 28: 355-359, 2005.
- Korytkowski, M: Lessons from the Look Action for Health in Diabetes Study. *Indian Journal of Endocrinology and Metabolism*: S650-S653, 2013
- Larsen, RN, Mann, NJ, Maclean, E, Shaw, JE: The effect of high-protein, low-carbohydrate diets in the treatment of type 2 diabetes: a 12-month randomized control trial. *Diabetologia* 54:731-741, 2011.
- Lustman, PJ, Anderson, RJ, Freedland, KE, de Groot, M, Carney, R, Clouse, RE: Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care* 23:934-942, 2000.
- Lustman, PJ, Harper GW: Nonpsychiatric physicians' identification and treatment of depression in patients with diabetes. *Comprehensive Psychiatry* 28:22-27, 1987.
- Ma, J, Yank, V, Xiao, L, Lavori, P, Wilson, S, Rosas, L, Stafford, R: Translating the diabetes

- prevention program lifestyle intervention for weight loss into primary care: A randomized trial. *Jama Internal Medicine* 173 (2): 113-121, 2013.
- Marcus, M, Yasamy, MT, van Ommeren, M, Chisholm, D, Saxena, S, Depression: A global public health concern. WHO Department of Mental Health and Substance Abuse, 2012.
- Nabi, H, Chastang, JF, Lefevre, T, Dugravot, A, Melchior, M, Marmot, MG, Shipley, MJ, Kivimaki, M, Manoux, AS, Trajectories of depressive episodes and hypertension over 24 years: The Whitehall II prospective cohort study. *Hypertension* 57(4): 710-716, 2011.
- Potter van Loon, BJ, Radder, JK, Frolich, M, Krans, HM, Zwinderman, AH, Meinders, AE: Fluoxetine increases insulin action in obese nondiabetic and obese non-insulin-dependent diabetic individuals (Abstract). *International Journal of Obesity and Related Metabolic Disorder* 16(2): 79-85, 1992.
- Ryan, CM, Freed, MI, Rood, JA, Cobitz, AR, Waterhouse, BR, Strachan, M, Improving metabolic control leads to better working memory in adults with type 2 diabetes. *Diabetes Care* 29: 345-351, 2006.
- Wadden, T: Impact of intensive lifestyle intervention on depression and health-related quality of life in type 2 diabetes: the look ahead trial. *Diabetes Care* 37: 1544-1553, 2014.

## Appendix 1:





# PHQ-9 Patient Questionnaire

## Nine symptom checklist

Patient Name: \_\_\_\_\_ Date: \_\_\_\_\_

Dear Patient,

In an effort to provide the highest standard of care and meet the requirements of your insurance company, we ask that you fill out the form below. This form is used as both a screening tool and a diagnostic tool for depression. Your provider will discuss the form with you during your visit. Thank you for your cooperation and the opportunity to care for you.

1. Over the *last 2 weeks*, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
	0	1	2	3
a. Little interest or pleasure in doing things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Feeling down, depressed, or hopeless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Trouble falling/staying asleep, sleeping too much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Feeling tired or having little energy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Poor appetite or overeating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Feeling bad about yourself – or that you are a failure or have let yourself or your family down.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Trouble concentrating on things, such as reading the newspaper or watching television.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Thoughts that you would be better off dead or of hurting yourself in some way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

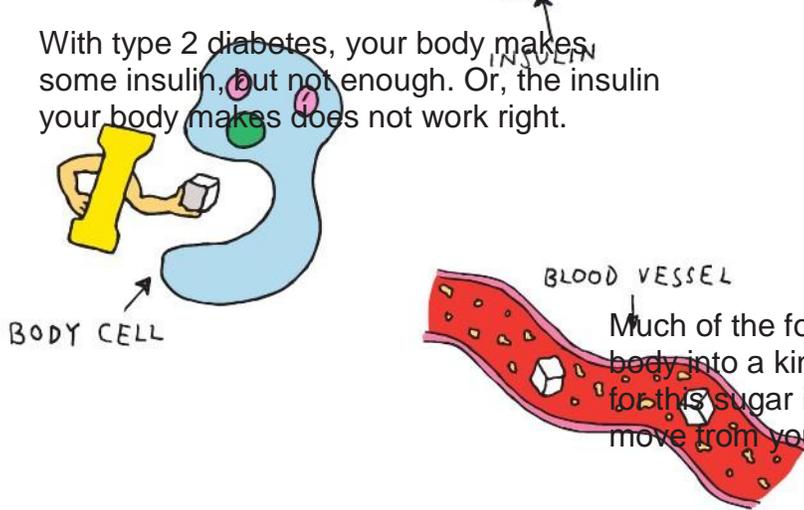
2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all                  Somewhat difficult                  Very difficult                  Extremely difficult



# TYPE 2 DIABETES

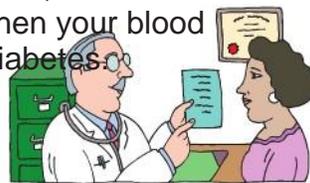
With type 2 diabetes, your body makes some insulin, but not enough. Or, the insulin your body makes does not work right.



Much of the food you eat is changed by your body into a kind of sugar. The medical word for this sugar is glucose. Insulin helps sugar move from your blood into your body's cells.



If you don't have enough insulin to move sugar from your blood into your body's cells, the amount of sugar in your blood goes up. When your blood sugar levels stay high, you have diabetes.



Type 2 diabetes is more common in adults, but the number of children and young people with type 2 diabetes is growing. Eating healthy foods, in the right amounts, and being physically active can help people lower their blood sugar. Most people with type 2 diabetes take diabetes pills and many also take insulin.

Diabetes cannot be cured, but you can control it! People who control their blood sugar levels can lead full and happy lives - just like everyone else. Talk to your doctor or health clinic for more information.