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Running head: APPRASIAL OF DEPRESSION AMONG INDIVIDUALS

Appraisal of Depression
Among Individuals with T2DM Not On Insulin Therapy

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College of Nursing
Fall 2018

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Acknowledgements

I want to thank my family for the support that have given over the last few years. My mom, husband and children have cheered me on when it would have been easy to give up. I appreciate each of them and will always be appreciative their commitment to my journey.

Next, I want to express my gratitude to Judi Daniels. She has been my mentor for over eight years. She is patient and kind. She answers my endless questions and is reassuring when I am doubtful. I could have not gotten this far without her advice. I aspire to be as committed to my practice and professionalism as she. She is my role model as a patient advocate and a professional nurse practitioner.

A special thanks to my committee members – Leslie Scott and Laura Hieronymus. I have appreciated their input and prospective on my DNP project. Both Leslie and Laura are highly esteemed in the College of Nursing and I am grateful they agreed to help me through this process.

Additionally, I would like to thank Beth Snider our clinic manager at Polk Dalton Clinic. Beth has been open to moving clinic days to allow class time, and allowing me to use Polk Dalton as my clinical site for my project.

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Abstract

BACKGROUND: Type 2 diabetes (T2DM) is a complicated disease process that affects more than 15 percent of adults in the state of Kentucky, with a national average of 9.4%. Individuals with diabetes are at increased risk for micro and macro neurovascular complications. Depression is a common co-morbidity and potentially affects their ability to manager this complex disease.

PURPOSE: The purpose of this study was to examine the prevalence of depression in a group of patients with T2DM, not on insulin therapy. Further, relationships between depression and blood glucose monitoring, Hgb A1c, other co-morbidities, number of medications taken, and demographics were explored.

METHODS: A retrospective chart review of patients with T2DM not on insulin was conducted. Descriptive and non-parametric statistics were used to examine the prevalence of depression in demographics, co-morbid conditions, HgbA1c levels, number of chronic medications and having a prescribed meter.

RESULTS: The sample consisted of 77 patient records. A diagnosis of depression was documented in 66 patients with 26 of those treated with an antidepressant. Only half of the sample were formally screened for depression. The only association between the variables and depression was among those who were overweight and obese (p value =.014).

CONCLUSIONS: The relationship between depression and BMI is common. From these results, the drivers of depression were not associated with diabetes, diabetes related co-morbidities or blood glucose monitoring. These findings reveal that depression is complex and may be associated with socio-economic variables. Providers must focus on the challenges depression can bring and consider those relationships in the management of those with chronic diseases.

Introduction

Type 2 diabetes mellitus (T2DM) is chronic disease that is often a direct result of years of unhealthy lifestyle choices. Over 14 % of the adult population in Kentucky and 9.4% nationally are diagnosed with diabetes, the majority of which are T2DM ("Kentucky Facts," 2018). The disease burden of T2DM can be overwhelming for the patient, family and friends. The patient or their family may not easily accept management that includes diet, exercise and medication. Additionally, the potential complications such as heart disease, renal failure, peripheral neuropathy and vision impairment further challenges patients. Living with this complicated disease often links to depression, which left undiagnosed and untreated is associated with worsening of the diabetic state (Rhee, Capistrant, Schommer, Hadsall, & Uden, 2017). The purpose of this project was to examine depression in persons with non- insulin diabetes patients and the contributing factors.

Background

Diabetes is a chronic disease state wherein there is progressive pancreatic beta cell defect, which results in a hyperglycemic state (Vilmaz, Kusmar, & Yesildag, 2018). This disease is far from simple, as it requires high engagement by the patient in their treatment regime. Patients must address the very lifestyle habits that contributed to the development of the disease. This treatment consists of dietary modifications, routine exercise, diligent foot care, eye exams, routine healthcare visits, and engagement of an array of medications ((Hill, 2017)). The latter includes a range of options from oral medications to insulin.

Health care providers have considerable challenges in helping patients understand the pathology of the disease, etiology, and the management with diet and exercise (Cannon, Handelsman, Heile, & Shannon, 2018). One of the most important aspects of diabetic education is helping patients become aware of hypoglycemic or hyperglycemic events. One intervention has been for patients to perform home glucose monitoring as a method for understanding how adherence to their treatment plan affects their blood glucose. Although not recommended by the (“ADA 2018”) the patient may be asked to check glucose readings fasting, postprandial and at bedtime. Blood glucose monitoring is discontinued as the individual becomes more knowledgeable about what lowers and raises their blood glucose (“ADA”, 2018).

Often providers are not aware of the unexpected consequence of home glucose monitoring. Patients find glucose monitoring uncomfortable and costly. The needle sticks used to obtain capillary blood are painful, and costs from monitor, strips, lancet and alcohol wipes maybe costly if not covered by insurance. Home glucose monitoring, diet modifications, exercise, clinic appointments and medication regimes can have an emotional impact on the individual. The American Diabetic Association has named this problem “diabetes distress” ("Diabetic Distress," 2013). It is a common but significant reaction to the demand of managing a chronic long-term disease.

The complexity of care can and does lead to depressive symptoms. These symptoms typically result in how the individual feels, thinks, and acts. (Depression, 2017). Depression among those with diabetes may also be associated with the feeling of being different from friends and family due to the demand of diabetes management (Markle- Reid et al., 2018). If patients have made some modifications and do not see immediate benefits, it can lead to a decrease in engagement with their self-care activities. When the full scope of diabetes

management is not embraced and patients begin to experience complications, it is possible for feelings of hopelessness to take over. Unfortunately, Akincigil & Matthew (2017) reported only four percent of primary care patients in general are screened for depression in primary care.

The electronic medical records system has increased depression screening (Akincigil & Matthew, 2017). The Medicare Access and CHIP Reauthorization Act (MACRA) of 2015 requires a provider to screen patients for depression at least annually ("MACRA," 2018). This will encourage providers to screen those with diabetes and potentially improve quality of life for this group. Coupling diabetes and depression often leads to increase in healthcare costs. Depression can impair the individual's self-care skills increasing the risk for additional co-morbidities (Juarez-Rojo et al., 2018). It is estimated that \$245 billion are spent annually on diabetic care (Statistics, 2017). Healthcare providers need to embrace all those with diabetes to foster self-care management. This would include recognizing factors that are associated with depression or diabetes distress.

Literature Review

A literature review was conducted in CINHALL using the following key search terms: "T2DM", "depression", "co- morbid conditions", "primary care and chronic disease", and "disease burden". Only articles in the last five years were used for the project. The studies were from both the United States and international journals.

Diabetes is a worldwide problem and affects 9.4% of the population in the United States. In Kentucky over 15% of the adult population has a diagnosis of diabetes, with 90-95% of these adults having T2DM ("CDC," 2015). Furthermore, statistics demonstrate the T2DM in the population of 65 and older will increase by 4.5 fold by the year 2050 (Clua-Espuny et al., 2017). This rise in numbers will increase health care utilization and cost.

Diabetes is a multi-faceted disease that can lead to feeling different from family and friends. Changes in lifestyle include blood glucose measurement, diet, exercise management and medication adherence (Dunning & Martin, 2017; Markle-Reid et al, 2018). If the patient experiences any disease symptoms, it increases stress. Concern for complications, their future, the worry of losing self-sufficiency, and becoming dependent on others can affect their lives in a negative fashion (Vilmaz, Kusmar, & Yesildag, 2018). In comparison to the general population, persons with diabetes have more psychosocial problems (Vilmaz et al., 2018). These problems can lead to blood glucose irregularities by affecting the neuroendocrine and hormonal systems directly and indirectly (Vilmaz et al., 2018). Further, this can lead to poor adaptation of self-care, which will result in poor quality of life and greater mortality (Halliday et al., 2017).

Causes and Consequences of Diabetes

Obesity has been long associated with an increased risk of a T2DM diagnosis. Insulin resistance More than 90% of those with T2DM are overweight or obese ("Obesity," 2013) Obesity is often reflective of a lifestyle. Over eating contributes to obesity, which can contribute to diabetes (Semenkovich, Brown, Svarik, & Lustman, 2015). Emphasis in the primary care clinic must include a healthy diet and a normal BMI. Unfortunately, these lifetimes ingrained habits are the hardest to change.

Exercise is the next key component to living a healthy lifestyle. Healthy people 2020 reports a combine exercise and a healthy diet increase one's ability to revert to normal glucose readings ("2020," 2016). Walking 120-150 minutes three or more times a week will decrease BMI, Hgb A1c levels and systolic blood pressure ("SCRIPT," 2018). The nurse practitioner should consider the patient's environment and obstacles before putting a plan together. Education on the benefits of exercising is a starting point to share the benefit of exercising

Medication is a challenge for the diabetic. Prescriptions range from orals to insulin. Many diabetics have expressed skepticism concerning the effectiveness of the medications and feel some may be creating more harm than good (Dhippaymon & Krass, 2015). Navigating through insurance carries and formularies create challenges for the provider and patient.

Reducing the risk of co-morbidities is essential for the person with T2DM. More than 40% of diabetics have three or more comorbidities compared to the general population. These conditions include heart disease, stroke, skin and soft tissue infections, vision changes, neuropathy and depression (Aikincigil & Matthews 2017; Markle- Reid et al, 2018). Sub optimal glucose control can lead to the risk of life changing complications such as loss of vision and amputation (Hill, 2017). T2DM represents a substantial disease burden that leads to increased healthcare utilization and self-care burden over time (Dunning & Martin, 2017). Lower quality of life and co-morbid complications can lead to interference with social and occupational activities (Cannon, Handelsman, Heile, & Shannon, 2018).

Outside the vascular and neurological complications associated with uncontrolled blood glucose, a patient's psychosocial wellbeing must be acknowledged. Depression screening in the primary care office has been debated over the last few years. The United States Preventive Task Force currently recommends screening annually in primary care (Maurer, Raymond, & Davis, 2018). Issues such as lack of time to screen properly and the concern for lack of mental health providers have caused many providers to avoid screening (Toft Kristensen, GuassorA, Arreskov, Waldorff, & Holge-Hazelton, 2018).

Unfortunately, screening for depression is not consistent between gender and race. Aikincigil and Matthews, (2017) report females, Caucasians and those with chronic conditions are more likely to be screened for depression. In general, women are more forthcoming about

psychosocial issues whereas men often talk about anger and insomnia (Aikincigil & Matthews, 2017). For these reasons, a recommended screening tool such as the PHQ2-9 should administered yearly. Semenkovich, Brown, Svarik, and Lustman reports individuals with T2DM are twice as likely to be depressed over the general population. Undoing the disparity in screening will be necessary for proper identification, an effective treatment plan and involvement of an inter-professional health care team.

An aspect often not recognized as contributing to depression are the challenges in those living in poverty. Patients who struggle with paying rent, buying groceries and keeping their children in school tend to put their health last (Shepherd & Wilson, 2018). Poorer families live in neighborhoods with fewer grocery stores who sell fresh fruits and vegetables at affordable prices. Outdoor exercise may be limited if the area is crime ridden. Social determinants affect health outcomes proving to be more of an impact than the medications prescribed (Webb & Matthew, 2018). Those with diabetes who are impoverished may have additional challenges living with a chronic, disabling and expensive disease.

Theoretical Framework

Using a theoretical framework one can examine the relationship of variables in a systematic approach. From this, associations are used to help forecast anticipated events (Thompson, 2014). In nursing research, a theory can act as a road map for conduction of a study or research project. For this project, Dorothea Orem's Self-Care Deficits Model was chosen to help understand possible relationships between depression and health variables.

Orem's Self- Care Deficits Model

Dorothea Orem's theory of self-care deficit applies to the diabetic who is at risk for a chronic disabling disease. The first step of planning is to conduct a survey of the person. Variables such as gender, education, income and comorbid conditions are analyzed. This enables the nurse to understand the challenges the person lives with. From the assessment the nurse is able to put a nursing plan in place that reflects the patient, family and providers' viewpoint ("Orem," 2012). Orem's theory lays a foundation to teach the patient about their disease in a way that allows the patient to understand how their choices affect their disease moving forward.

Teaching self-care skills is an important aspect for the patient with diabetes as their disease requires daily attention. Orem focuses on disease nutrition, a clean environment and adequate resources ("Orem," 2012). Orem's goal is to reduce the self-care deficit in the patient. This would lead to improved quality of life and to promote the patient as a self-care agent. Improving quality of life and the patient becoming a self-care agent would promote a sense of wellbeing and a decrease in depression.

Purpose

The purpose of this project was to identify the incidence and factors associated with depression in persons with T2DM's. The project included the most common variables associated with diabetes and depression. These variables included demographics, HgbA1c levels, medications; home glucose monitoring and co-morbid conditions. This project was conducted in an urban clinic located in an impoverished area of Lexington, Kentucky. The Quality Improvement Committee in the clinic chose diabetes to focus upon and this project complements other aspects of diabetic

Methods

Setting

The sample consisted of patients from a local community primary care clinic on the northeast side of Lexington, Kentucky. This is an impoverished area where the median household income is \$18,000 annually. The clinic serves primarily a Medicaid population and 50% of the patients are international. The clinic's mission is to serve the community by improving their health through committed care and programs that will exceed the patient's expectations (E. Snider, personal communication, March 5, 2018). There are three physicians, three nurse practitioners and they care for an average of 300 patients a week.. The clinic serves an excellent opportunity for the students and residents.

Study Design

A retrospective chart review of patients with T2DM patients, not on insulin was conducted. Descriptive and non-parametric statistics were used to examine the prevalence and association of depression and patient demographics, presence of co-morbid conditions, HgbA1c levels, number of chronic medications and if prescribed a meter and frequency of home monitoring. The data was obtained from the University of Kentucky AEHR system. The study was conducted under the umbrella of the clinic's Quality Improvement program.

Study Population

A data sheet was populated by using the most common diabetic code (E11.9). A list of 280 patients were identified as T2DM's. From that list 77 patients met the study inclusion criteria.. Inclusion criteria included the following: were over 18 years of age, had an Hgb A1c of 6.5 or greater, were not on insulin therapy, and had a clinic visit between January 1-June 30,

2018. Those excluded were persons with Type One Diabetes, those who were pregnant and those with gestational diabetes.

Research Procedures and Data Collection

The University of Kentucky Information Technology Department queried the database for patients that met the inclusion criteria. The data was stored in a University of Kentucky laptop with a secure password. A crosswalk table was developed that would link the patients' medical record number to the study ID. The data will be stored for 5 years in a secure University of Kentucky laptop. The crosswalk table was shredded on completion of data analysis. The most current version of SPSS (25) was utilized.

Data Analysis

A description of the sample included means for continuous data and frequency with percentages for nominal and ordinal data. The statistical analysis for depression and co-morbid conditions were analyzed using Chi Square, the 2- sample T test or the Pearson's Product Moment test for correlation to between BMI, HgbA1c and number of co –morbidity. The p-value for statistical significance was set at .05.

Results

From the identified 280 patients 77 met the study criteria for study inclusion. The sample demographics are displayed in Table 1 (see Appendix A). The majority were female (65%, n = 50) and evenly distributed between Blacks and Caucasians. The mean age was 60 years with a range of 37-78 years of age. Medicaid was the largest insurance payer with both private and Medicare with each representing 25% of the sample.

Overall, 51 % (n =39) of the patients were screened with the PHQ 2-9 for depression in the last year. There was a diagnosis of depression in 86% (n = 66) of the sample with only 34%

(n =26) prescribed an antidepressant. Only four percent of the sample had a documented mental health provider.

In Table 2, (see Appendix B) the frequency and type of co-morbidities and number of daily medications are presented. Approximately 53% (n = 41) of the sample were taking between six to 10 daily medications. The majority (69%, n = 53) of the patients had two or more co-morbidities. The most common co-morbidities were hypertension (83%, n = 64) hyperlipidemia (70%, n = 54), vision changes (21%, n = 16), COPD (21%, n=16). Interesting only 26% (n = 20) of the sample were documented as smokers.

HgbA1C's between 6.5 and 7.9 had the highest percent at 77% of the sample. A meter had been prescribed to 32% (n =25) of the sample with only 25% (n =19) monitoring their home glucose. The frequency of testing was not clearly documented and therefore ranged anywhere from daily to monthly.

The variables were explored for their relationship to the diagnosis of depression. For purposes of analysis, the presence of depression was considered positive if there was an actual PHQ2-9 score, having a prescribed antidepressant, or there was a diagnosis of depression. In Table 3 (see Appendix C) results from the correlational analyses is presented. The only significant association found was between the BMI category and depression ($r = 2.505$; $p = .014$). A higher proportion of those who were depressed had BMI's that reflected being overweight or obese. Vision changes along with COPD were the only other co-morbidities that came close to reaching statistical significance ($r = 3.366$ $p = .067$).

Discussion

In contrast to the literature review, there was only one true significant association for depression. Finding being overweight or obese had a positive relationship with depression is not unusual as this is well documented in literature. Unexpectedly no other variable helped to explain the frequency of depression in the sample group. Clearly, the factors surrounding depression in this sample of patients with T2DM was not captured in this study. Yet a number of findings are worth acknowledging and can assist providers in providing comprehensive care to patients with T2DM.

The current ADA guidelines do not endorse T2DM not on insulin therapy to monitor blood glucose readings at home. Some patients with T2DM ,on oral medications, periodically check their blood sugar as they adjust their diet in achieving blood glucose goals. In this sample, 32% of patients had a glucose meter, and only 25% were testing. The frequency of testing was difficult to abstract from the chart. Further, there was no relationship between having a meter and HgbA1C levels. Providers who prescribe an unnecessary meter is costly to both the patient and insurance carrier. It may also add to diabetes distress.

Vision and COPD were not statistically significance but clinically is significant to one's day-to-day life. A change in vision has the potential to affect activities such as reading and driving. COPD is a disabling disease on its own. Becoming dependent on inhalers and oxygen can increase the patient's burden of disease. Interestingly, those smoking (26%) aligned with Kentucky's state average of 26%, which is higher than the national average of 17%.

The depression screening results are higher in the sample (50%) than what is reported in the literature (51%). Yet only 26% were treated for depression. These numbers percent a disparity between diagnosis and treatment. There has been an association between poverty and

smoking. As the clinic is located in, an impoverished area and a higher percentage of smokers were expected.

The lack of association between the majority of variables and incidence of depression is curious. The underlying cause may be the link between poverty and depression cannot be ignored in someone with a complex disease such T2DM. Those living in poverty often put transportation, housing and safety before a healthy lifestyle and keeping appointments. A sense of well-being will take precedence over a prescribed treatment plan. Working with patients who are impoverished requires a provider to put the patient's life outside of the clinic first. A treatment plan without resources will be ineffective. Primary care in low-income areas will be challenged to meet all of the patient's needs.

Implications for Clinical Practice

There are a number of clinical implications from this project. The providers must address depression screening. The disparity between screening, diagnosis, and treatment was glaringly evident. Using the quality improvement process, providers and clinic staff will need to identify processes that will ensure at least annual screening. This may include having patients complete the PHQ2-9 distributed by the nursing assistance while waiting for the provider.

Given the difficulties in the current electronic medical record for screening alerts, the clinic may opt to identify a three-month period in which all patients are screened for depression. This would help to ensure at least annual screening. Providers must keep patient medical problem lists up to date. Just as medications are reconciled at each visit, so must the problem lists. This will help for continuity of care and identify where interventions need to be addressed.

The most important outcome of this study is the need for a mental health provider within the clinic. The diagnosis of depression was found in the majority of the sample but treatment

was not easily identified. With only three receiving mental health counseling, having access to a mental health provider on-site would be a tremendous asset.

Further more emphasis on understanding social stressors and demands the patients experience cannot be ignored. The current type of data being gathered does not give a clear picture of what patients are trying to navigate along with their health issues. Resources such as a community worker in the clinic would be a benefit for assisting with food, housing and transportation.

Future Study Recommendations

Poverty was not captured in this study by using insurance as a marker. Most with Medicaid are in a lower socio-economic status and interviewing patients would provide more detailed information. Poverty has been linked to having more day-to-day issues with survival, which may take precedent over health for many. An assessment via an interview could identify barriers such as availability to fresh fruits, vegetables, and access to safe areas in their neighborhoods to walk and exercise.

More importantly, understanding the patient's perception of their disease is a natural consequence from their family history. Living in poverty with a complex chronic disease such as T2DM may be more than a provider is willing to recognize in caring for this patient. Examining the patient's day-to-day struggles and assisting when able will foster better outcomes and a partnership for a better life.

Summary

T2DM is a known complicated disease. Keeping appointments, remembering medications and feeling different from others can lead to depression. Depression then leads to a decrease in activity, a negative change in eating habits and a loss of social contacts. It is well

recognized depression affects persons with T2DM twice as often as the general population. Screening and identification must become an integral part of the primary care visit. The availability of a mental health provider in the clinic would make a positive difference in the care of this population. Poverty cannot be ignored as a factor in the patient's ability to manage their disease. Factors such as transportation, housing, food and safety must be understood as obstacles in self-care management. Providing the patient with community resources will signify to the patient that they are understood and give hope for their disease process and relationship to the clinic and providers. Providing care that includes addressing social deterrents along with their clinical presentation will allow for improved outcomes for the patient

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Demographic Variables

Table 1

Demographic Variables

Variable	Frequency (n =77)	Percent
Gender		
Male	27	35
Female	50	65
Race		
Black	40	52
White	30	39
Hispanic	7	9
Insurance		
None	3	10
Medicare	19	25
Medicaid	31	40
Private	19	25

Table 2. Co –morbidity Variables

Variable	Frequency (n = 77)	Percent
COPD	16	21
Hyperlipidemia	54	70
Hypertension	64	83
Neuropathy	6	12
Vision changes	16	21

