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THE IMPACT OF COLLABORATIVE BEHAVIORAL HEALTH ON TREATMENT
OUTCOMES OF DIABETES

by

Adam M. Johnson

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Marriage and Family Therapy

Approved:

W. David Robinson, Ph.D.
Major Professor

Josh Novak, Ph.D.
Committee Member

Tim Curran, Ph.D.
Committee Member

Richard S. Inouye, Ph.D.
Vice Provost for Graduate Studies

UTAH STATE UNIVERSITY
Logan, Utah

2019

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ABSTRACT

THE IMPACT OF COLLABORATIVE BEHAVIORAL HEALTH ON TREATMENT
OUTCOMES OF DIABETES

by

Adam Johnson, Master of Science

Utah State University, 2019

Major Professor: Dr. Dave Robinson
Department: Human Development and Family Studies

In this study, I hypothesized that patients who utilized collaborative care, involving both medical and behavioral health providers, will decrease overall medical utilization when compared to a control group of patients receiving only standard medical treatment. I also hypothesized that patients who utilized collaborative care will experience a greater increase in overall health comparatively. Although previous research has shown collaborative medical and behavioral health treatments to be effective in improving health outcomes for patients who have a chronic illness. I found no significant difference in the improvements in health outcomes (A1c) made by my treatment group who received psychosocial intervention in addition to standard medical treatment for diabetes management when compared to my control group who received only medical treatment. I did find that collaborative treatment was associated with increases in medical utilization as were increases in age and initial A1c levels. Clinical implications include the need for therapists to remember that BPSS intervention should be used in collaboration with medical treatment rather than in place of and they should be aware of how biological factors, such as age and severity of symptoms, may affect psychosocial-spiritual

factors commonly addressed in therapy when working with patients who have chronic illnesses like diabetes.

(48 pages)

PUBLIC ABSTRACT

THE IMPACT OF COLLABORATIVE BEHAVIORAL HEALTH ON TREATMENT
OUTCOMES OF DIABETES

Adam Johnson

A current body of research is finding significant connection between biological, psychological, social, and spiritual factors in health and wellbeing. Some studies have found significant improvements in treatment outcomes for patients who received medical treatment in collaboration with psychosocial therapeutic treatment. In this study, I sought to observe the impact collaborative treatment had on patients with diabetes who were treated at a community health center. I compared the treatment outcomes of a group of patients who received a collaborative treatment, looking to see if their overall health (measured by A1c, a diabetes severity marker) and medical utilization (or their number of doctors' visits).

I found no significant difference in the improvements in health outcomes (A1c) made by my treatment group who received collaborative treatment in addition to standard medical treatment for diabetes management when compared to my control group who received only medical treatment. I did find that collaborative treatment was associated with increases in medical utilization as were increases in age and initial A1c levels. Clinical implications include the need for therapists to be aware of how biological factors, such as age and severity of symptoms, may affect psychosocial-spiritual factors commonly addressed in therapy when working with patients who have chronic illnesses like diabetes. I hope that these findings will lead future research into the association of collaboration and medical utilization in order to find if there are any clinical benefits to recommending increased utilization for patients who are older or begin treatment with higher A1c levels.

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Adam Johnson

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CHAPTER I

INTRODUCTION

In response to an increase in awareness of interconnected biopsychosocial-spiritual (BPSS) factors (Engle, 1977; Hodgson, Lamson, Mendenhall, & Crane, 2014), collaborative treatment addressing BPSS factors is being recommended more and more frequently (Sivapalasingam et al., 2014). Current research has shown that collaborative care, where therapeutic treatment of psychological, interpersonal, and spiritual issues is integrated into medical treatment of chronic health conditions, can provide clinicians with better treatment outcomes (Lustman & Clouse, 2002), patients with more positive health care experiences (Hodgson, McCammon, Marlowe, & Anderson, 2012), insurance companies with cheaper costs (Crane, Christenson, Dobbs, Schaalje, Moore, Pedal, & Marshall, 2013), and administrators with a more efficient medical system (Hodgson et al., 2014). Not only could collaborative treatment improve over health for more people, but better health and strong family relationships can significantly improve individual's quality of life (Cundiff, Birmingham, Uchino, & Smith, 2016).

My goal in this study is to examine the effect collaborative health care, that addresses BPSS needs holistically, can have on medical outcomes for patients being treated for diabetes. Previous research has already shown that psychotherapy for comorbid mental health concerns, like depression, can improve coping and influence the course of medical conditions (Sledge & Gold, 2010). Other findings have found that supportive social relationships can prevent contraction of disease, ease the course of symptoms, and even speed up the recovery process following illness or injury (Broadbent & Koschwanez, 2012). With this study, I hope draw from

clinical data gathered over five years in an integrated community health center where medical providers work in collaboration with behavioral health providers who are trained to address BPSS factors, potentially allowing us to improve both the comorbid psychological as well as the connected social and spiritual issues in treatment of patients with diabetes. I hope to help address the gap in research, identified by Lustman and Clouse (2002), who called for, “long-term studies that examine the effects of depression treatment on the eventual expression of the complications of diabetes.” Results will be discussed for their implications in clinical application and future directions for research.

CHAPTER II

LITERATURE REVIEW

Introduction

Often patients with chronic illness, such as diabetes or cardiovascular disease, also suffer from a related mental health condition, commonly depression and anxiety (Lustman & Clouse, 2002). Moreover, their family relationships may be struggling as well due to increased stress associated with caregiver responsibilities or the threat of losing an ill family member. To provide a more comprehensive form of treatment for patients suffering from chronic illness, it's important for behavioral health providers to address the biological, psychological, and social needs of their clients. This can improve the client's overall sense of well-being and quality of life, which can then positively influence the outcomes of their condition (Engle, 1977).

As I seek to see if comprehensive treatment can improve treatment outcomes for biological, psychological, and social problems, I will review the current literature surrounding the use of Engel's holistic biopsychosocial model (1977), examining how each factor- biological, psychological, and social- influence each other. I will then address the problematic split in the current healthcare system between medical and mental health services and explore the literature supporting Medical Family Therapy (MedFT) as a strong comprehensive treatment model to bridge that split. Finally, I will outline how this study will add to current research by comparing longitudinal samples of patients who received collaborative therapy, which addressed psychological, social, and spiritual issues in addition to standard medical treatment of diabetes. I hope to further support the claim that treatment approaches, which comprehensively address

biological, psychological, social, and spiritual factors improve treatment outcomes and overall health for the patient.

The Biopsychosocial Model

In 1977, Engel proposed a new model to help in diagnosing increasingly interactive mental, medical and social problems. He called it the biopsychosocial model (Engle, 1977). Emphasizing the fact that reductionistically looking for a single source of a problem limits treatment outcomes and fails to treat other aspects of well-being that might be influencing patients' illness. Assessing for factors from the different areas of a patient's life collectively allows treatment to reach to biological aspects such as physical health and medical conditions, psychological aspects like mental disorders or positive thinking, and social aspects revolving around relationships with family and friends. Years later, a 4th aspect was added considering the impact of a patient's spirituality, which includes factors such as meaning-making, values and beliefs, and even religious influences (Wright, Watson, & Bell, 1996). The biopsychosocial-spiritual (BPSS) model is used to holistically improve all aspects of a patient's life that may be contributing to their current condition (Engle, 1977). This model has been fundamental for integrated fields such as health psychology and medical family therapy.

One new area of research, which highlights the interconnectedness of the BPSS model, is psychoneuroimmunology. Psychoneuroimmunology is used to examine the relationships between psychological and social factors and disease or health, and their impact on the immune system (Byrne-Davis, & Vedhara, 2008). Experts look to see if strong family or social relationships and positive thinking can help make a person physically more resilient in

preventing and recovering from injury or disease. These claims are strongly supported by the current research in the field (Broadbent & Koschwanez, 2012).

Impact of Social factors on Biological and Psychological Functioning

There are multiple social factors that play a role in physical and psychological functioning. Family functioning can have an incredible impact, both positive and negative, on mental and physical health. Social factors like economic hardship, inability to make connections with peers, cultural demands can lead to higher levels of stress, weakening the immune system (McDade, 2001). Distress in marriage and family relationships can lead to higher levels of depression and anxiety (Russo, Coker, & King, 2017). Divorce has been associated with damaging impacts on achievement, self-esteem, and physical well-being for children as well as their parents (Zeratsion et al., 2015).

While negative relationships can take their toll on a person's psychological, biological, and social functioning, they can have an equally positive effect when relationships are strong (Jaremka, Lindgren, & Kiecolt-Glaser, 2013). Strong social support has been linked to better psychological functioning and improved physical recovery following injuries (Broadbent & Koschwanez, 2012). A happy marriage is another common factor in health outcomes such as longevity (Kaplan & Kronick, 2006), prevention of chronic illness (Cundiff et al., 2016) and mental illness (Deklyen, Brooks-Gunn, McLanahan, & Knab, 2006). In fact, marriage quality has been identified as a key factor in later life well-being and quality of life appraisals (Carr, Freedman, Corman, & Schwarz, 2014). People who remain in unhappy marriages are more prone to higher distress, significantly lower reported feelings of happiness, life satisfaction, self-esteem, and overall health (Hawkins & Booth, 2005). Theoretically, I argue that interventions

targeting family and social relationships could improve psychological and biological functioning as well.

Impact of Psychological Factors on Biological and Social Functioning

Psychological factors like stress and depression consistently influence biological systems, leading to symptoms like reduction of antibodies in the immune system, increasing a person's exposure to illness (Jaremka et al., 2013). For example, stress induced inflammation may be a key reaction linking distress to poor health and is a risk factor in cardiovascular diseases, type 2 diabetes, metabolic syndrome, and frailty (Jaremka et al., 2013). Positive psychology, on the other hand, can lead to a greater resiliency in immunity and better health, a point emphasized in psychoneuroimmunology (Byrne-Daves & Vedhara, 2008).

Psychological interventions seeking to improve mental functioning have been connected to positive biomedical outcomes across several different chronic illnesses (Irwin, 2008). Psychotherapy was successful in improving the conditions of irritable bowel syndrome in 66% of studied patients, ages 16-60 (Creed et al., 2003). Additionally, disturbances in sleep and social life, general distress, and coping with work and marriage were also improved in these subjects, leading to higher quality of life. There are examples also of cognitive-behavioral therapy (CBT) being implemented simultaneously with standard hospital treatments having significantly decreasing patients' bodily complaints because of better insight into the psychosomatic causes of their pain (Ehlert, Wagner, & Lupke, 1999). One may argue that these results are due to the presence of somatoform disorders, but the point is that psychological and medical health are deeply intertwined. This fact is reinforced by studies showing the bidirectional effects of medical and psychological interventions in treatment for individuals with schizophrenia (Briand et al., 2006). It is likely that in treating one aspect, you will improve the

other as well (Engle, 1977). Collaborating treatment between medical providers and mental health providers could capitalize on biopsychosocial-spiritual interplay and improve both medical and psychological treatment outcomes for patients.

As far as psychological impact on families goes, DSM-5 and family systems (Russo et al., 2017) examines case studies for each of DSM-5 diagnoses, highlighting how a mental illness affects everyone in a family system, not just the diagnosed individual. Some examples include spouses having to shoulder the brunt of parental caregiving responsibilities while their partner struggles during a major depressive episode, or families experiencing increased anxiety due to the unpredictable nature of a manic episode for an individual with bipolar disorder. When seeking to treat families, it is essential to examine all aspects that may be factoring into the presenting problem.

Impact of Biological Factors on Psychological and Social Functioning

While some biological factors such as sleep, diet and exercise have all be linked to positive mental and social outcomes (Sarris, O'Neil, Coulson, Schweitzer, & Berk, 2014), I will focus primarily on the impact that chronic medical conditions such as diabetes can have on individuals psychological and relational well-being. Medical conditions can have direct impact on mental and social functioning of an individual (*DSM-V, 2013*). Often, medical and mental issues will have a comorbid, or coexisting, relationship, in which they simultaneously worsen each other (Sprah, Dernovsek, Wahlbeck, & Haaramo, 2017). Neglecting to address this connection between mind and body in treatment, could cause psychotherapy and medical procedures to be less effective, providing few benefits to patients and possible leading to higher rates of relapse (Sprah et al., 2017).

For families, a new diagnosis of a medical condition can lead to enormous changes in the lives of the individual diagnosed as well as their family members. The adaptations required to accommodate a family member who is diagnosed with cancer, for example, can monopolize many resources available to the family as treatments begin to take priority over jobs, vacations, socializing, family events, and needs of other family members. Harrington, Kimball, & Bean (2009) suggested that families dealing specifically with childhood cancer become part of a distinct culture surrounding the illness. That and the anxiety of possibly losing a loved one can significantly and even permanently change family relationships (Harrington et al., 2009).

Sellers (2000) emphasized the importance of an integrated care model to address psychological and relational effects of cancer and cancer treatment on patients and loved ones. Medical family therapists (MedFTs) have specific training in family relationships and the effects of restructured relationships in response to traumatic experiences (Paris & Dankoski, 2011). Thus, relieving the burden of other team members and enhancing the patient's care experience by addressing the family become essential contributions by a MedFT to the treatment process (Harrington et al., 2009).

Interconnectedness of All Health Domains and the Additional Consideration of Spiritual

For a long time, research has tried to piece apart biological, psychological, and social influences on patient's health to identify, isolate, and repair problematic symptoms and their causes (McDaniel, Hepworth, & Doherty, 2014). An important part of the BPSS model is the understanding that biological, psychological, social, and spiritual factors do not operate in isolation, but rather are intimately intertwined and continually influence each other (Engle, 1977; McDaniel et al., 2014).

Wright and colleagues (1996) encouraged the addition of the spiritual component of the BPSS model to help providers account for the complex experience patients have with their health and illness across all these domains, and to address how family beliefs can impact treatment outcomes. Spiritual beliefs can increase resiliency and provide a framework for families to make meaning of illness and death but can also hinder patients from pursuing treatments that might be at odds with personal values (Hodgson et al., 2014). Although I will focus less on spiritual factors through the methods and discussion of this study due to the fact that I had no data measuring spiritual influences, I would like to note that spirituality has been identified as a critical component of patients' and families' health care and well-being (Chapman & Grosseohme, 2002; Fogg, Flannelly, Weaver, & Handzo, 2004), and that patients often bring up spiritual concerns as they try to navigate the complex interactions of BPSS factors during treatment (Hodgson et al., 2014).

Problematic Separation of Mental, Medical, and Family Health Services

For much of the history of modern medicine, the medical field has focused on the human body and how disease can be accounted for by deviations from the norm of measurable biological (or somatic) variables (Engel, 1977). This has been very effective in understanding and treating physical disease. Meanwhile, the field of psychology has focused more on human development and how mental disorders can be diagnosed by deviations from the norm of behavioral measures (Engel, 1977). In the last half a century, however, the two sciences have been growing closer together due to advances in neurobiology and other sciences that have explored the interactive nature of the mind and body (Bayer, Beale, & Viamontes, 2009) and

evidence of this interconnected relationship has prompted both the medical and mental health fields to begin integrating their patient care (Hodgson et al., 2014).

Attempts to consider biological, psychological, and social aspects of illness collectively, and to provide comprehensive treatment can be seen in the training of medical practitioners to assess for mental illnesses. This is often accomplished by the implementation of mental health screening instruments in medical health clinics for patients and their supporting families. Medical providers who have been trained to recognize mental health aspects of illness have been successful in providing brief interventions to patients in their clinics (Brodaty & Andrews, 1983). For example, the diagnosis and inclusion of behavioral health specialists in treatment of somatoform disorders has also saved time and effort in medical settings (Kojima, 2006). What's more, the addition of mental health screening instruments like the PHQ-9 and GAD-7 (Palmer & Coyne, 2003), have increased awareness of depression and anxiety, which have been found to impact patient recovery, and helped practitioners provide more comprehensive treatment that addresses all of the patient's needs (Dooley, 2013). Some mental health providers, as encouraged by the BPSS model, have made adjustments to include their patient's physicians in treatment plans, and I hope to continue to see this become standard practice (McDaniel et al., 2014).

As discussed earlier, research has shown that psychotherapy focused on improving psychological and social functioning can have a positive effect on the outcomes of treatments for medical conditions (Sledge, 2010). However, because of the current split in the healthcare system of the United States, receiving treatments for multiple different health conditions often means visiting multiple providers for different treatments at different offices (Hodgson et al., 2014). Because of the legal complexities of sharing confidential information between healthcare

providers, information is often incomplete or not shared at all. This leads to uninformed treatment that can take too long to deliver and which is possibly redundant, inaccurate, and not cost efficient. In fact, Berenson and Burton (2011) found that one in seven hospitalized Medicare patients had a healthcare error due to lack of communication, and one in five patients were released, only to be readmitted within 30 days. This inefficient care drives medical costs up while failing to provide long term solutions to the patients and creates a need for an integrated healthcare system that provides a full range of collaborative health services to meet patients need in a competent way.

Potential for Medical Family Therapy to Bridge the Gap Between Two Fields

In 1992, in an attempt to connect biological, psychological, and social factors in treatment, Susan McDaniel, Jeri Hepworth, and William Doherty introduced a new field called Medical Family Therapy (MedFT) as a way to provide comprehensive treatment to individuals and families dealing with medical problems (McDaniel et al., 2014). Basing their approach in the BPSS model, they began to seek connections between physical and mental illness and to address illness from a systemic, or family oriented, standpoint. The field of MedFT places a large emphasis on the benefits of collaboration between medical and mental health providers and seeks to train MedFT's on how to bridge the gap between the two fields (Pais & Dankoski, 2011).

Marlowe and colleagues (2012) suggested a framework of integrated primary care (IPC) that would maximize a MedFT's or other behavioral health professionals (BHP's) efforts in a primary care setting and minimize the impact of healthcare errors due to lack of communication. They suggested a five-step process: (a) BHP gathers an initial understanding of

patient's case from medical records, (b) introduces themselves to the patient and addressing their role as part of the medical team, purpose of the psychosocial assessment, and that their involvement did not mean that there was bad news to report, (c) elicits the illness story using a BPSS framework, (d) begins intervention, commonly using brief problem solving/supportive therapy, psychoeducation and/or behavioral education, or referring the patient for additional services, and then (e) relays the information received back to the medical provider to inform holistic treatment of the patient's needs. A trained MedFT's position in medical centers could also resolve issues caused by the legal complexities of sharing client treatment information between separate clinics.

While collaborating between the medical and mental health fields is the important, distinctive quality of MedFT, the focus on the family system is still its central purpose. Early on, Doherty, McDaniel, & Hepworth (1994) reemphasized this fact when he pointed out that just as we often distinguish between 'medical illness' and 'psychological illness,' we also separate both issues from family problems. They said, "As practical as these distinctions may be for everyday discourse, they only represent ways that I 'punctuate' the seamless web of human life" (pg. 12). At times this has been misunderstood to imply that family patterns cause disease, but what is actually emphasized is the interactive nature of biopsychosocial-spiritual problems whereby family patterns and disease mutually maintain each other (Wood et al., 1989).

As MedFTs maintain their family-oriented focus in medical and behavioral health clinics, they will be able to address presenting problems in a more comprehensive way. As evidenced by the amount of current research surrounding the family regarding the effects of relationships on health and well-being, family focused preventative measures and interventions have the potential to be incredibly beneficial to patients in their treatment outcomes.

Application of MedFT in Treatment of Diabetes

Diabetes, type 2, is one chronic illness that gets a lot of attention from researchers looking at BPSS impacts of diabetes, and potential benefits to wholistic treatment of BPSS factors on diabetes management (Lustman & Clouse, 2002). Diabetes has been estimated to cost \$282,937 (Seuring, Archangelidi, & Suhrcke, 2015) over one lifetime, and can accelerate the presentation of conditions such as coronary heart disease, potentially shortening patient life span (Lustman & Clouse, 2002). Diabetes is also often associated with increased symptoms of depression (Novak et al., 2017a) and spousal distress (Trump et al., 2018). The impact diabetes can have across every aspect of a patient's life serves as a great example of how the BPSS model can help improve many aspects of patient well-being, and potentially provide more lasting improvements in biological outcomes.

Stress is commonly examined as a moderating factor in diabetes management, stressors such as disease specific stress (Anderson et al., 2016), economic stress from increased medical expenses and decreased productivity as a result of diabetes (Novak et al., 2017b), marital stress (Trump et al., 2018), and everyday life stress (Anderson et al., 2016). Personality traits and depressive symptoms have been found to moderate patients ability to cope with the increased stress associated with managing diabetes (Novak et al., 2017a), but partner support has been found to affect patients' stress (Trump et al., 2018), depression (Novak et al., 2017a), treatment adherence (Anderson et al., 2016), and long term well-being (Crane et al., 2013). This implies that treatment of social, psychological, and spiritual factors concurrently with medical treatment of biological diabetes factors could be a more effective mode of treatment, a proposal which my study seeks to corroborate.

The Purpose of This Study

The purpose of my study was to examine the impact biopsychosocial-spiritually oriented interventions can have on medical treatment outcomes of diabetes, reinforcing the claim that in treating one aspect of general health you can simultaneously improve other aspects as well, as emphasized by the BPSS model (Engel, 1977). Lustman and Clouse (2002) found that psychotherapy treating comorbid depression improved medical treatment outcomes for diabetes, as measured by biomedical markers such as hemoglobin A1c (A1C). However, they stated that treatment approaches that consistently improve depression and diabetes measures have not yet been discovered (Lustman & Clouse, 2002).

In addition to improving biological health markers, findings from psychoneuroimmunological research indicate that improved family relationships may help sustain the healing in medical and mental illnesses following treatment (Broadbent & Koschwanez, 2012). What's more, Crane and colleagues (2013) identified family therapy was the most cost-efficient modality of psychotherapy in treatment of depression, reducing levels of depression in fewer sessions and decreasing rates of recidivism for patients. Reduced medical utilization could benefit both patients and healthcare systems financially (Seuring et al., 2015). These two points led to our second hypothesis that collaborative care would also decrease medical utilization by patients who sought therapy as part of treatment for their diabetes and comorbid depression.

I proposed that the holistic approach to treatment used in medical family therapy, in coordination with standard medical treatments, could be effective at improving biological outcomes health outcomes in treatment of diabetes, as well as decreasing utilization. From a

BPSS perspective, behavioral health providers, such as MedFT's, who are trained to collaborate with medical providers in addressing biological, psychological, and social factors interactively could address comorbid issues that affect physical health such as depression (Lustman & Clouse, 2002), family caregiving (Sivapalasingam et al., 2014), or beliefs about medication compliance (Dooley, 2013).

Research Hypotheses

1. When compared to a control group of patients receiving only standard medical treatment, I hypothesize that patients who utilized collaborative care, involving both medical and behavioral health providers, will decrease overall medical utilization.
2. When compared to a control group of patients receiving only standard medical treatment, I hypothesize that patients who utilized collaborative care will experience a greater increase in overall health.

CHAPTER III

METHODS

In this study, I analyzed existing data as part of routine clinical appointments at a community health center. The health center provides healthcare services from physicians, nurse practitioners, physician assistants, behavioral health therapists, dentists, and pharmacists. The data were gathered as part of routine medical and therapy appointments by utilizing preexisting measures. Using this data, I identified a sample of patients who sought therapy in addition to their standard medical treatment for diabetes. Comparing this group to a control group of patients only receiving medical treatment, I looked to see if collaborative healthcare, addressing BPSS issues together, led to improvements in their physical health and medical utilization.

Procedures

Licensed behavioral health providers and graduate level interns under clinical supervision offer therapy in collaboration with medical treatments to patients at a medical health center. Their placement allowed them to address the patients' medical conditions along with additional psychological disorders or family problems that either resulted from, led to, or exacerbated their medical problems. Using the BPSS model, these behavioral health providers sought to comprehensively address these factors as part of the treatment the patients receive at the medical center.

Like a procedure used by Delgadillo and his associates (2017), my data were gathered as part of routine clinical care over the past 5 years at a community health center. Retrospective clinical case records for a cohort of patients receiving family therapy were analyzed. My

study was conducted using fully de-identified data, and therefore did not require informed consent from the participants. Demographical information included the total number of encounters patients had, age, gender, ethnicity, health plan, provider, and marital status. I excluded records with no baseline or post treatment data, or records with only one therapy visits or which were seen only as part of a behavioral health consult.

Sample

Table 1

<i>Interval Descriptives</i>					
Demographic	Group	N	Mean	SD	Range
Age	1	60	55.5	10.6	53.0
	2	29	47.5	14.2	55.0
Encounters (per 6 months)	1	60	2.53	1.62	10.5
	2	29	4.34	2.31	9.24
A1C Oldest	1	59	7.54	1.79	8.90
	2	29	8.30	2.75	8.90
A1C Most Recent	1	60	7.09	1.57	7.70
	2	29	7.88	2.10	7.80

Table 2

<i>Categorical Descriptives</i>					
Demographic	Group 1 (n = 60)		Group 2 (n = 29)		
	N	Percentage	N	Percentage	
Race					
White	49	82	20	69	
African American	0	0	1	3	
Asian	0	0	1	3	
Native American	2	3	2	7	
Pacific Islander	0	0	1	3	
Multiple Races	6	10	2	7	
Declined	3	5	2	7	
Sex					
Male	26	43	13	45	
Female	34	57	16	55	
Marital Status					
Single	12	20	12	41	

Married	35	58	14	48
Divorced	11	18	1	3
Widowed	2	3	1	3
Declined	0	0	1	3
Health Plan				
Medicaid/Medicare	9	15	4	14
Privately Insured	33	55	13	45
Private Pay	2	3	0	0
Financial Assistance				
Slide 1 (Below National Poverty Line)	11	18	9	31
Slide 2 (133% National Poverty Line)	2	3	1	3
Slide 3 (150% National Poverty Line)	1	2	2	7
Slide 4 (200% National Poverty Line)	1	2	0	0

Note. Due to rounding, totals may not equal 100.

Case records were divided into two groups – a treatment and control group. My treatment group was gathered using a combination of codes for family therapy, psychological conditions, and chronic medical conditions. Patients diagnosed with diabetes who were also seen by behavioral health providers in the clinic were included in the sample. A control group was then formed from data provided by the records of patients who were treated for diabetes but never sought therapy in collaboration to their standard medical treatment, so I can compare the rates of improvement in physical health.

Over 3000 patients were reported to have received treatment for diabetes in this community health center over the past 4 years, of which sixty subjects were randomly selected for my control group. Only 58 patients were reported to have been treated for diabetes and accessed behavioral health intervention over the past 4 years. Of that group, 29 subjects met the inclusion criteria for my treatment group and were included in the sample. Those who were only seen for Screening, Brief Intervention, and Referral for Treatment (SBIRT), or case management were not included in the sample because they did not receive family oriented collaborative therapy. Only seven subjects were excluded due to their receiving therapy unrelated to their diagnosis of diabetes or relational issues, as indicated by their lack of a social component of the

goals, interventions, or structure of therapy. Another nine subjects were excluded because they had no measures of A1C.

The control group ($n = 60$) was made up of 34 females and 26 males. In my control group, 35 were married, 12 were single, 11 were divorced, and two were widowed. Ages ranged from 22-75 years ($M = 55$, $SD = 10.6$). Of the control group, 81.67% were Caucasian, 3% were Native American, 10% declared being multiple races, and 10% refused to report their race.

The treatment group ($n = 29$) was made up of 16 females and 13 males. In my treatment group, 14 were married, 12 were single, 1 was divorced, one was widowed, and one refused to share. Ages ranged from 20-75 years ($M = 47.5$, $SD = 14.2$). Of the treatment group, 69% were Caucasian, 3% were African American, 3% were Asian, 7% were Native American, 3% Pacific Islander, 7% declared being multiple races, and 7% refused to report their race (see Table 2).

Measures

Hypothesis 1

In this study, I limited medical utilization to include problem visits and follow-up visits with medical providers, as well as nurses' visits. Auto-prescribing encounters and routine check-ups were not included in the measurement, as we hope that such encounters would remain consistent as part of good health maintenance, regardless of whether patients received certain medical or behavioral health intervention. Behavioral health visits were also excluded from our medical utilization measurement, as we are looking to see what effect collaborative therapy will have on medical outcomes.

Hypothesis 2

I used medical markers, specifically Hemoglobin A1c (A1c) lab results, to track the course of diabetes management in both the treatment group and the control group to compare treatment outcomes for the course of the conditions. A1c is a test measuring average glucose levels over a 3-month period. A1c levels range from 4%-5.6% for people without diabetes, 5.7-6.4% means someone is at higher risk for diabetes, and levels over 6.5% means someone has diabetes. In the community health center where my data was collected, A1c results lower than 7% were considered “in compliance,” meaning patients were managing their diabetes well. I used markers of A1c levels at two time points, the oldest lab on patient records and the most recent. As data was gathered during routine clinical visits, A1c levels were taken on different dates for different patients. This pre-post marker allowed us to account for change that happened during the duration of treatment at my clinic.

Data Analysis

Hypothesis 1

The goals of the analyses were to determine whether collaborative healthcare had a significant effect on treatment outcomes of diabetes. For my first research question I ran a Poisson regression analysis to see if the utilization of medical services decreased during collaborative treatment. For the purposes of this study, medical utilization was defined as a problem visit or follow up visit with the primary medical provider or a nurse visit. Routine immunizations, lab draws, and automatic prescription refills were not counted.

Hypothesis 2

In order to compare the multiple variables, I observed for the second research question, I first ran independent t-tests to see if there were differences between the control and treatment groups at either pre- or post-treatment. I then computed a repeated measures ANOVA to see if there any difference in the rate of change between the groups from pre- and post-treatment. Finally, I utilized a multiple regression analysis to examine how my two groups changed between pre- and post-treatment two while controlling for other variables. I first wanted to know if the change of my treatment group was significantly different than the control in indicators of diabetes management (A1c). I then ran more specific comparison analyses within the multiple regression model, looking at significant associations between other possible moderating factors and outcomes for my treatment and control groups.

CHAPTER IV

RESULTS

First, using a Poisson generalized linear model, I identify variables that were associated with significant changes in overall medical utilization. Results will be discussed in depth in the following section. Next, results of the calculated multiple linear model are outlined, addressing how well my grouping variable predicted post-treatment HgA1c.

Hypothesis 1

A Poisson generalized linear model was used to find significant associations between variables and medical utilization counts. The control group had significantly lower medical utilization ($p < .001$) on average ($M = 2.53$, $SD = 1.62$) than did the treatment group ($M = 4.34$, $SD = 2.31$). Patients in the treatment group (group = 2) were 55.7% more likely to have additional visits for every 6-month period ($\exp(B) = 1.557$, $p < .001$). Additionally, married and divorced subjects were significantly more likely to visit the doctor than single members of my sample (married $\exp(B) = 1.292$, $p = .007$, divorced $\exp(B) = 2.981$, $p < .001$), and males were more likely than female patients ($\exp(B) = 1.079$, $p = .042$). Age was also significantly associated, with subjects ($\exp(B) = 1.010$, $p < .001$) being 1% more likely to have more visits for each additional year in age. Initial A1c count was also significantly associated with increases in medical utilization ($\exp(B) = 1.030$, $p < .001$) with subjects having 3% more doctor visits every 6 months for every 1 unit increase in initial A1c.

Hypothesis 2

Independent sample *t* tests were calculated as a preliminary analysis to ensure equality between the two groups. I found no significant difference, so I know I have equality between the groups. A repeated measures ANOVA was then calculated to measure changes in A1c scores for both groups. A significant decrease in A1c levels from time 1 to time 2 was found for both groups as a whole ($F = 4.84, p = .03$), indicating that treatment at the community health center was successful in helping patients move towards compliance in their diabetes management regardless if they received additional collaborative behavioral health services. However, differences between the control and treatment groups at pre- (control: $M = 7.54, SD = 1.79$, treatment: $M = 8.30, SD = 2.31, p = .121$), and post-treatment (control: $M = 7.09, SD = 1.57$, treatment: $M = 7.88, SD = 2.10, p = .051$), and in the rate of change ($F = 1.11, p = .997$) indicate that there was not a significant difference in outcomes for patients who received collaborative medical and psychosocial treatment.

A multiple linear regression was calculated to predict end A1c levels based on beginning A1c levels and case grouping. Model results showed that treatment group was not a significant predictor ($b = .0718, p = .840, \beta = .0190$). A1c level pretreatment was a significant predictor of A1c levels post-treatment, where each unit increase in A1c beginning scores was associated with lower ending levels of A1c ($b = -.5092, p < .001, \beta = -.6180$) while controlling other variables. Other factors such as age, sex, marital status, and health plan were not found to have significant associations with final A1c levels.

CHAPTER V

DISCUSSION

Hypothesis 1

Interestingly, patients in my treatment group had significantly higher medical utilization, the inverse of what I had thought would be the case. Generally, higher medical utilization accompanies increased costs, and as past research, such as Crane et al. (2013), found family therapy to be the most cost efficient psychotherapeutic treatment for conditions such as depression, further research should seek to replicate this result and explore the possible benefits of increased utilization that may be associated with collaborative healthcare which would make higher cost of treatment worth it. Outcomes such as improved quality of life, patients feeling more involved or informed in treatment, higher patient satisfaction with treatment, and increased resilience or relapse prevention (Crane et al., 2013) should be considered in future efforts to explain the moderating effect of collaborative care on medical utilization.

This study also found that age, gender, and severity of pretreatment A1c, were associated with significant increases in medical utilization. Surprisingly, men in this sample were more likely to visit the doctor than women, a finding which contradicts much of the research regarding gender and medical utilization (Han et al., 2018; Koo, Madden, & Maguen, 2015; Ting et al., 2017). However, this was the case for both the control and experimental group, implying that this may be the result of a particular demographic rather than collaborative intervention.

Increases in age are frequently found to be associated with increases in medical utilization (Fergus, Griggs, Cunningham, & Kelley, 2017; Han et al., 2018; Roquet et al., 2018). In this study, I did not look to see specifically how collaborative healthcare affected different age

groups, however, in future studies I hope to explore how addressing psychosocial-spiritual issues related to aging (Emanuel, Bennett, & Richardson, 2007) might impact medical utilization as well as other health outcomes, seeing as this study corroborated the finding that older patients access healthcare more frequently than younger ones do.

Regarding severity of pretreatment A1c leading to increased utilization, it is possible that medical providers encourage patients with poorer health hygiene habits or treatment compliance to seek collaborative behavioral health intervention to address issues that are preventing them from managing their diabetes (Clark, Linville, & Rosen, 2009). Future studies should enquire the degree to which collaborative therapists encourage increased medical utilization, either for psychotropic medication consultations or increased involvement in or compliance with treatment recommendations from physicians.

Hypothesis 2

In this study, I did not find significant improvements of measures of A1c nor significant decreases in medical utilization like I hypothesized in my treatment group of patients who went to therapy for psychosocial treatment in collaboration with their standard medical treatments. It is important to note that patients with higher pretreatment A1c tended to have lower post-treatment A1c than other patients, indicating that there may be a table effect in diabetes management, where once A1c levels have been brought to manageable levels, it is more difficult to see significant decreases regardless of the type of intervention. In the future, I plan to see if collaborative healthcare significantly improved treatment outcomes, specifically for patients who started above the threshold of compliance in management of their diabetes.

Clinical Implications

Due to the similar change in medical outcomes for patients with diabetes in my control and treatment group, I am unable at this time to add my voice to that of other researchers (Sivapalasingam et al., 2014), providing support for the inclusion of collaborative health care in treatment of diabetes based on my study. However, with the results of this study showing a significant decrease in A1c for both groups, I would like advocate for the efficacy of current medical treatments of diabetes and remind collaborative health care providers that therapeutic intervention addressing psychological, social, and spiritual factors has been shown to be beneficial in collaboration with, and not in place of, medical treatment (Marlowe et al., 2012). Additionally, therapists should be aware of how biological factors, such as age and severity of symptoms, may affect psychosocial-spiritual factors commonly addressed in therapy when working with patients who have chronic illnesses like diabetes.

Limitations

Most of this sample was white, heterosexual, married patients, which inhibits my ability to generalize these findings to all populations. My treatment group sample size ($n = 29$) was inadequately powered to assess the differences in treatment outcomes between my control and treatment groups. While I was able to find enough subjects that met the criteria of my control group to pool a randomized sample, I did not randomize my treatment group, instead using all 29 subjects that met the inclusion criteria. This does less to control for confounding variables in my sampling, which can be one of the problems associated with using existing data. I hope to

collaborate with other community health centers to continue adding to my sample, and wonder if a replication of my study with an adequate sample size would find similar or different results.

Furthermore, because my data were gathered as part of clinical visits, the time intervals between data points and especially between patients varied greatly. I had hoped to be able to use more psychological measures, such as anxiety assessments (GAD-7), and more biological measures such as current glucose levels in addition to the 3-month averages shown by A1c tests, but the data gathered in the clinic on other measures was too inconsistent to be useful. I had also wanted to include more chronic health conditions than just diabetes, such as hypertension, but were unable to gather a sample of patients who met my inclusion criteria. The fact that behavioral health providers were able to address biopsychosocial issues in collaboration with medical providers was an incredible strength to my study. However, because the data were gathered from retroactive records, I was not able to control for therapist style or competency.

Using retroactive data to quickly form a longitudinal study was an incredible strength for my study, but it did limit us in the amount of control I had over potential confounding variables. Only clinically relevant data were gathered as part of treatment, such as A1c and PHQ-9 scores, limiting my ability to control for compounding life factors that may have affected health outcomes such as work stress, family crisis, or unexpected lifestyle changes. For example, patients began and ended treatment at different points throughout the 5 year span of my clinical observation, but because I observed their health using a retroactive study, I was unable to inquire why they began or ended treatment, whether that was because they moved to a new community, their insurance changed, they were referred elsewhere, or any number of confounding circumstances that happen as part of everyday life.

Lastly, I made some procedural decisions, such as inclusion and exclusion criteria, based on available data and clinical practicality. Should I use a larger research team in future extensions of this study, these decisions might be different.

Future Directions

A prospective study where goals and parameters were established before gathering a sample and beginning to track data could have given us more control over the confounding variables that affected my study. Future studies which identify a sample population that could benefit from collaborative biopsychosocial intervention and proactively tracking treatment outcomes longitudinally throughout treatment could increase my ability to observe more variables that may be influencing health outcomes and provide more consistently tracked time points, making it easier to analyze and find associations later on. For example, I could begin to ask why patients in my treatment group increased their medical utilization and begin looking for ways to study that trend.

As part of this study, I also gathered data including psychological measurements and characteristics of therapeutic treatment such as length and style that I hope to be able to use to answer further research questions looking for more specific interactions between biopsychosocial factors beyond just overall treatment outcomes in A1c levels for patients who were also treated for diagnoses of depression. Additionally, it may be possible to look more closely at the changes in my control and treatment group using all the longitudinal data points I have using a multi-level statistical model. Doing so would also allow me to look more closely at the interactions between treatment outcomes and demographic variables such as age and pretreatment severity of A1c.

Conclusion

Although previous research has shown collaborative medical and behavioral health treatments to be effective in improving health outcomes for patients who have a chronic illness (Delgadillo et al., 2017; Lustman & Clouse, 2002), probably due to my limited sample size, I found no significant difference in the improvements in health outcomes (A1c) made by my treatment group who received psychosocial intervention in addition to standard medical treatment for diabetes management when compared to my control group who received only medical treatment. I did find that collaborative treatment was associated with increases in medical utilization as were increases in age and initial A1c levels. I hope that these findings will lead future research into the association of collaboration and medical utilization in order to find if there are any clinical benefits to recommending increased utilization for patients who are older or begin treatment with higher A1c levels.

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APPENDIX

IRB Approval

**Institutional Review Board**

USU Assurance: FWA#00003308

**Exemption #4****Certificate of Exemption****FROM:**

Melanie Domenech Rodriguez, IRB Chair

Nicole Vouvalis, IRB Administrator

To: W Robinson, Timothy Curran, Joshua Novak, Adam Johnson, Andrew Jensen
 Date: June 20, 2018
 Protocol #: 9151
 Title: The Impact Of Family Therapy On Chronic Medical Conditions

The Institutional Review Board has determined that the above-referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #4:

Research, involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

This exemption is valid for three years from the date of this correspondence, after which the study will be closed. If the research will extend beyond three years, it is your responsibility as the Principal Investigator to notify the IRB before the study's expiration date and submit a new application to continue the research. Research activities that continue beyond the expiration date without new certification of exempt status will be in violation of those federal guidelines which permit the exempt status.

As part of the IRB's quality assurance procedures, this research may be randomly selected for continuing review during the three year period of exemption. If so, you will receive a request for completion of a Protocol Status Report during the month of the anniversary date of this certification.

In all cases, it is your responsibility to notify the IRB prior to making any changes to the study by submitting an Amendment/Modification request. This will document whether or not the study still meets the requirements for exempt status under federal regulations.

Upon receipt of this memo, you may begin your research. If you have questions, please call the IRB office at (435) 797-1821 or email to irb@usu.edu.

The IRB wishes you success with your research.

4460 Old Main Hill Logan, UT 84322-4460

PH: (435) 797-1821

Fax: (435) 797-3769

WEB: irb.usu.edu

EMAIL: irb@usu.edu