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Influence of Patient Engagement Protocol on Health Outcomes and Medication Adherence of Patients with Metabolic Syndrome

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This is to certify that the doctoral dissertation by

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Abstract

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MPA, Troy University, 1999

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

Management of metabolic syndrome (MetS) may be enhanced by promoting patient engagement. Training health care providers in the conceptual and practical application of integrative patient centered care tools may promote patient lifestyle behaviors for better management of MetS. The purpose of this quantitative quasi-experimental study was to assess the impact of training providers in integrative patient centered care for patients with MetS. The biopsychosocial construct provided the conceptual framework for the study. Two groups of physicians were included; one received training in an integrative model (IM) while the second received no training and provided usual care (UC). Following training, patient disease biometrics and medication adherence were monitored for approximately four months. Due to a diminished sample size in the completer data set, an intention to treat (ITT) data set was created with baseline values brought forward. In the ITT set, BMI decreased significantly (p=0.005, d=0.18) with each group over time: (IM: 32.9 ± 7.3 Kg/m^2 to 31.6 ± 6.8 Kg/m^2) and (UC: 32.1 ± 6.7 to 31.5 ± 6.3 Kg/m^2). However, there were no statistically significant differences between these two groups' measures. In the completer set, BMI decreased significantly (p < 0.05, d=0.18) over time with the IM group, but not the UC group: (IM: 35.14 ± 7.9 Kg/m^2 to $33.65* \pm 7.62$ Kg/m^2) and (UC: 32.4 ± 6.62 Kg/m^2 and (32.4 ± 6.5 Kg/m^2); indicating a possible relationship between the intervention training (IM) and improved health outcomes. Thus, providers are assisting patients with important lifestyle choices to better manage MetS, potentially leading to social change around improved patient health care behaviors and advancement in providers' patient centered practices.

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Dedication

This dissertation is dedicated wholeheartedly to my sons Blake and Brandon Bremer who were the inspiration for me to pursue this health program and who supported me by being family team players through ongoing upkeep of our household and by giving consistent unwavering thoughtfulness and love. Boys, I could not have done this without you, and I appreciate your extraordinary encouragement. I am so proud of you both and so happy I was able to get published before Blake, my rising Virginia Tech Freshman. In addition, I want to thank my family and friends who supported me completely, were patient with my hermit-like behavior, and held firmly to the belief that one day I would again have life outside of my PhD pursuit.

Acknowledgements

I would like to thank NOVA Medical Group and Dr. Grace Keenan, Dr. Chris Connolly, Mr. Hassan Ahmed, and Ms. Heather Norman for their ongoing, consistent support during my research and data collection. I am grateful for my Chair, Dr. Scott McDoniel, who took on this study for what seemed to be a lifetime of communication and concentrated effort.

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Chapter 1: Introduction

Understanding the impact of patient engagement on health outcomes of chronic disease patients is of critical interest due to escalating health care costs and an epidemic of chronic disease in the United States. The Centers for Disease Control and Prevention (CDC, 2011) stated the rates of chronic diseases such as obesity, cardiovascular disease, stroke, and cancer are increasing and account for 75% of the two trillion dollars spent on health care. This spending makes chronic disease the leading factor in current health care expenditures in front of technology, prescription drugs, and administrative costs (CDC, 2011; Kaiser, 2012). To prevent chronic disease, researchers should examine the risk factors and how to mitigate them. Metabolic syndrome (MetS) is diagnosed in a person with three or more symptoms or precursors to chronic diseases such as cardiovascular disease, type 2 diabetes, and stroke (Dickerson, Smith, McNeal, & Ory, 2011; Ma & Zhu, 2013). The symptoms include obesity, hyperglycemia, low cholesterol high-density lipoprotein (HDL), and high triglycerides or hyperlipidemia (Burghen, 2005; Ma & Zhu, 2013). Dagogo-Jack, Egbuonu, and Edeoga (2010) indicated that health care providers should start chronic disease intervention treatment at the onset of MetS or before to decrease the cumulative effects of associated symptoms.

Impact of Patient Engagement

Even though there is abundant research on MetS, there is a gap in best practices on successful ways to treat and prevent these symptoms (Appel, Jones, & Kennedy-Malone, 2004; Burghen, 2005; Dickerson et al., 2011; Ma & Zhu, 2013). There is limited research on the link between MetS treatment approaches such as integrative patient

centered care and how providers are or are not taught to interact with their patients.
Recent research on combinations of factors indicated further study due to protocol-
specific limitations (Ampt et al., 2009; Brady, Solomon, Neu, Siberry, & Parekh, 2010;
Burghen, 2005; Fifield et al., 2010; Graham, 2014; Jacobson & Gance-Cleveland, 2011;
Karve & Hayward, 2010; Wiley et al., 2015; Xiang, Wethington, Onufrak, & Belay,
2014). This limited research, with 50% focusing on pediatrics, has left a gap in
understanding how integrative patient centered training may positively impact MetS
symptoms in adults. The most influential factor for reducing cardiovascular and diabetic
symptoms, which may be promoted by positive patient engagement, is ideal lifestyle and
behavioral changes (Jacob & Serrano-Gil, 2010; Kones, 2013; Nield, 2008; Wolever et
al., 2011). In addition to the gap in research, the concept of patient engagement has been
poorly defined and has been interpreted and applied in nonstandardized ways by
stakeholders across the health care industry. This is contributing to confusion regarding
this complex concept that has the potential for effective application including improving
self-health promotion, medication adherence, and health outcomes (Barello, Graffigna, &
Vegni, 2012; Bertakis & Azari, 2011; Institute of Medicine, 2001).

Gaps in understanding patient engagement indicate the need for ongoing research
to further define and understand the various applications and impact of patient
engagement on medication adherence and health outcomes (Barello et al., 2012; Bertakis
& Azari, 2011; DiMatteo, Hays, & Sherbourne, 1992; Dunbar-Jacob & Mortimer-
Stephens, 2001; Institute of Medicine, 2001). Much qualitative and quantitative research
has been done around patient engagement; however, there is little consensus on what this

concept means, and limited understanding of how it is used throughout the medical industry. Patient engagement is defined by the Agency for Healthcare Quality and Research (AHQR, 2011) as "an ongoing process in which patients take an active role in their own healthcare" and involves how factors such as "personal skills, motivation, and behaviors - affect an individual's ability to effectively engage in care" (p. 1). Barello et al. (2012) described the confusion around the widely used term and recommended a multi-perspective approach such that various aspects are analyzed to include "interaction between its individual (i.e., emotional, cognitive and behavioral, etc.), relational (i.e., patient health providers, patient caregiver,...etc.), and organizational (i.e., type of health care settings,…role and attitude of health professionals, etc.), dimensions across the specificities of each single disease" (p. 7). Barello et al. determined that additional research is required to develop empirical evidence based on theoretical construct taking into account what factors affect patient engagement. Based on the lack of conformity around the meaning and use of the term patient engagement, research conducted to methodically define, develop, and establish practical and economically feasible application is necessary. This study addressed the effects of an integrative patient centered provider training protocol on integrative patient centered and whether there was an associated effect on medication adherence and health outcomes. Two groups of patients were compared: (a) providers trained on integrative patient centered care (the intervention group), and (b) providers not trained on integrative patient centered care (the control group).

Background

Patient engagement is defined by the Agency for Healthcare Quality and Research (AHQR, 2011) as "an ongoing process in which patients take an active role in their own healthcare" and involves how factors such as "personal skills, motivation, and behaviors-affect an individual's ability to effectively engage in care" (para 1). Simmons, Wolever, Bechard, and Snyderman (2014) followed this definition with their systematic review of clinical trials on patient engagement. Out of 543 abstracts evaluated, only 10 trials met the researchers' criteria that defined patient engagement as (a) understanding the importance of taking an active role in one's health and health care; (b) having the knowledge, skills, and confidence to manage health; and c) using knowledge, skills and confidence to perform health-promoting behaviors (Simmons et al., 2014, p. 3). Understanding what patient engagement is based on these criteria from the Agency for Healthcare Research Quality and a large systematic review provided a foundation for examining whether patient engagement was correlated with medication adherence and health outcomes.

Problem Statement

Understanding how to use patient engagement to promote positive lifestyle behaviors is key to improving health outcomes for MetS patients. Training health care providers on the conceptual and practical application of integrative patient centered engagement tools has not been studied as a method for patient engagement promotion. If this component of health care and delivery was better understood and was shown to

correlate with improved patient engagement, it may encourage providers to empower their patients to practice motivated self-health care and medication adherence.

Purpose of Study

The purpose of this study was to assess how patient engagement in their health care influenced health outcomes (MetS symptom improvement based on associated biometrics) and medication adherence, defined as taking or not taking medication (noted on electronic health record (EHR) or patient reported). Results may be used to develop and implement practical and financially feasible practices that may promote improved health care outcomes, increased medicine adherence, and enriched patient provider engagement (Cox, 2011; Engel, 1977; Guarneri & Tager,, 2014; Simmons et al., 2014; Williams, Frankel, Campbell, & Deci, 2000).

Nature of Study

I used a quantitative quasi-experimental design with a time interval method employing a pre-intervention data capture (baseline) and post-intervention data capture at approximately four months post-intervention training. I performed repeated measures multivariate analysis of variance (MANOVA) (Campbell & Stanley, 1963; Creswell, 2009; Frankfort-Nachmias & Nachmias, 2008). The influence of patient engagement factors on disease management outcomes biometrics (blood pressure, triglycerides, BMI, blood glucose: serum and A1c, and high density lipoproteins) and medication adherence (defined as taking or not taking) were compared between two patient groups within a health care clinical system. The intervention group received integrative patient centered care training, and the control group did not receive integrative patient centered care

training. The intent of the intervention group was to determine the effects of newly administered patient centered provider training on patients with MetS. I analyzed and compared the differences between groups. The outcomes of the integrative patient centered training can be compared to other patient engagement efforts to determine levels of effectiveness based on disease management outcomes and medication adherence.

A patient engagement research predictor/independent variable (provider integrative patient centered care education) was analyzed to determine its influence on dependent variables (subsequent health outcomes and medication adherence).

Research Questions (RQs) and Hypotheses

RQ1: Is there a difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic?

H1n: There is no difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of patient engagement provider training protocol in an integrative health clinic.

H1a: There is a difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

RQ2: Is there a difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic?

H2n: There is no difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

H2a: There is a difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

Health outcomes and medication adherence were the dependent variables, and integrative patient centered engagement provider training was the independent variable.

Conceptual Framework

The biopsychosocial construct is based on mind/body medicine in which a person's intrinsic capacities for disease prevention and healing are supported through integrating the understanding of their biology, psychology, and social influences into diagnosis and treatment; the biopsychosocial construct is often aligned with the patient centered approach to health care and delivery (Bausell & Berman, 2002; Cox, 2011; Engel, 1977; Fremont & Bird, 1999; Freudenreich, Kontos, & Querques, 2010; Klinkman & van Weel, 2011; Levin, 2009; Mauksch, 2005; Montori, Brito, & Murad, 2013; Moss, 2003; Scherger, 2005; von Bertalanffy, 1950; Williams et al., 2000). "Biopsychosocial care is complex work. It requires an attitude of caring for the whole person in all dimensions, including the family, cultural, and social contexts" (Scherger, 2005, p. 445).

Biopsychosocial care involves the provider listening to and engaging with the patient's explanation of his or her illness and issues, and aligning that insight with discussion and treatment. This intentional provider-patient engagement takes into account the patient's biology, psychology, and social influences that can impact symptoms and disease (Freudenreich et al., 2010; Gorgens, 2006; Montori et al., 2013).

Systems theory was founded by von Bertalanffy (1950) and was developed into a more current version by Engel (1977), who discussed the biopsychosocial concept as the impossibility of understanding illness without understanding the internal and external environment from which the patient resides. This model is different from the conventional biomedical model of care in which disease is observed according to the biological symptoms that define it, and treatment of symptoms occurs through pharmaceuticals and surgery (Bausell & Berman, 2002; Engel, 1977; Fremont, & Bird, 1999; Freudenreich et al., 2010; Gorgens, 2006; Levin, 2009). The biomedical model also stems from two reductionist concepts: it reduces a complex disease process down to a single factor, and mind-body dualism dictates separation of mental or behavioral issues from biological or somatic issues (Engel, 1977; Freudenreich et al., 2010; Gorgens, 2006).

My research approach was inclusive, involving both a biopsychosocial and biomedical understanding of the individual. The biomedical model was already in use and was the common ground from which to apply the integrative patient centered care training protocol. The integrative patient centered care training protocol comprised biopsychosocial training modules that provided education and skill development for the

health care provider with the intention of facilitating patient engagement to inspire or motivate the patient to improve self-care behaviors and medication adherence.

Operational Definitions

Biopsychosocial: Taking into account the patient's biology, psychology, and social influences that can impact symptoms and disease (Freudenreich et al., 2010; Gorgens, 2006; Montori et al., 2013).

Clinical inertia: "Lack of treatment intensification in a patient not at evidence-based goals for care. Clinical inertia is a major factor that contributes to inadequate chronic disease care in patients with diabetes mellitus, hypertension, dyslipidemias, depression, coronary heart disease, and other conditions" (O'Connor, Sperl-Hillen, Johnson, Rush, & Biltz, 2005, p. 1).

Healthy behaviors: Include healthy nutrition, exercise, stress management, restorative sleep, and pursuit of happiness (Guarneri et al., 2014).

Hemoglobin High A1c: ≤ 5.6 mg/dl.

High body mass index (BMI): ≤ 30 kg/m^2 is correlated with increased MetS and age (Beltrán-Sánchez, Harhay, Harhay, & McElligott, 2013).

High triglycerides: ≤ 150 mg/dl or treatment for this lipid abnormality

Hyperlipidemia: a metabolic condition causing high triglycerides and high cholesterol.

Hyperglycemia: raised fasting glucose ≤ 100 mg/dl or diagnosed type 2 diabetes (International Diabetes Federation, n.d.).

Hypertension: ≤ 140 mm Hg systolic or diastolic ≤ 90 mm Hg or treatment (Gionfriddo et al., 2014).

Low high density lipoproteins (HDL): > 40 mg/dl in men and > 50 mg/dl in women or treatment.

Metabolic syndrome: "A cluster of conditions—increased blood pressure, a high blood sugar level, excess body fat around the waist and abnormal cholesterol levels—that occur together, increasing your risk of heart disease, stroke, and diabetes" (Mayo Clinic, 2014, para 1). These symptoms align with established biometric standards from the International Diabetes Federation and American Medical Association JNC8 (International Diabetes Federation, n.d.; Gionfriddo et al., 2014).

Patient centered: An approach putting patients at the center of care, engaging their feedback, including them in decision-making, and ensuring they understand and are aligned with the treatment and care (Bertakis, Klea, 2011; Ganesh, 2009; Kraetschmer, Sharpe, Urowitz, & Deber, 2004; Tilburt et al., 2014).

Patient engagement: A patient being actively engaged in his or her health care and having the knowledge and ability to perform health-promoting behaviors to manage health (AHRQ, 2011; Simmons et al., 2014).

Assumptions, Limitations, and Delimitations

Assumptions

I assumed that NOVA Medical Group health care providers would participate in training and apply new knowledge and skills to their MetS patient groups. Also, I

assumed that all patient data were uniformly collected and results were compared using industry-standard objective metrics.

Limitations

Limitations may influence outcomes due to the following: (a) nonrandomization of sampling frame, (b) patients having only MetS versus a more advanced chronic disease, (c) patients not returning for follow-up appointments within 4 months or seeing a provider from a different group, and (d) providers not applying integrative patient centered care training methods. A factorial purposeful sampling method was performed with MetS patients as defined above. Patient data were not randomly allotted to a control or research group but purposefully selected within the sampling frame. Because of the group development and intentional placement of patient data into one of two groups due to sampling frame constraints, randomized placement was not feasible.

MetS patients were filtered out and selected based on the biometrics discussed above and/or their diagnosis of MetS. However, because only the above MetS symptoms were assessed, there may have been other symptoms or diagnoses related to chronic disease such as stroke or cancer that may not have been integrated into the assessment because they were not realized at time of selection. This could have influenced the health outcomes and the patient's ability to engage in lifestyle changes and medication adherence.

A third potential limitation was whether those selected for this study returned for follow-up appointments or whether they saw a different provider. In both groups, there was the potential that patients who had initial data collected on them did not return for

follow-up appointments with the originally assigned provider, at which time more biometric data would have been collected. Because I de-identified all patients and was only assessing de-identified data, no patient consent was requested, and neither information nor incentives were given to motivate patient cooperation in this study. This may have reduced the amount of patient biometric data collected post provider training, thus potentially skewing results. In addition, there was the possibility that all biometrics received initially may not have been captured the next time based on providers' clinical decisions and patient needs. If a lab biometric assessed initially was not indicated to be performed by the provider at the follow-up appointment, providers were under no obligation to have it performed and followed clinical practice guidelines. In addition, patients were aligned with their primary provider and divided into one of two research groups; it was possible they were not followed up by the original primary care provider and were seen by a provider from a different group, in which case their data would have been invalid.

Integrative patient centered care training was provided to one of two group of providers; it offered ideas, methods, and approaches that were intended to advance the provider's ability to engage with patients to promote healthy lifestyle behaviors, known as patient engagement. However, providers are different in how they learn and their ability to apply this training to their clinical patient visits. Also, the patient may not have had any desire to listen and apply suggestions on lifestyle and medication adherence regardless of how competently the provider engaged with them. These limitations on training, applicability, and patient acceptance, as well as the other limitations of non-

randomization of the sampling frame, and the possibility of patients not returning for follow-up appointments with their original provider, should be considered when assessing the results of the study.

Delimitations

Delimitations that frame this study included (a) applying a quantitative versus qualitative research methodology, (b) not conducting patient based surveys, (c) not researching chronic conditions as opposed to metabolic syndrome only, and (d) excluding those with conditions that may have impacted their biometrics or capacity to change lifestyle behavior and/or adhere to treatments such as those with severe psychological conditions.

Methodology. A quantitative methodology was chosen based on time frame limitations, including not having the time necessary to receive patient consent and NOVA Medical Group's preference for my research study. Keeping the time frame of this study to a practical 12 months warranted a quantitative rather than qualitative approach. There was not enough time to set up observational studies to include patient consent and integrating NOVA Medical Group's provider-patient workflow into a qualitative study. Using a quantitative method and collecting biometrics and medication adherence data at timed intervals allowed for more efficient data collection. However, not having patient based information on the provider's engagement approach and how they feel overall is a limitation in this study and should drive additional qualitative and quantitative studies. In addition, not being able to observe the providers with their patients prevented the ability to analyze and assess various themes of provider approach, training application, patient

reactions, and engagement that could drive provider training protocol development and be a factor in patient engagement.

Patient surveys. Understanding how patients feel about their providers, their treatments, and their personal health goals is a component to understanding overall health outcomes. Health outcome measurements for this study were limited to biometrics. Measurements did not include how the patient feels, which may be a key indicator of health and quality of life improvement. If patient engagement is based on behavior modification and behaviors are affected by how someone feels, then this could be a significant factor that should be pursued in future research.

Scope of patient population. Patient selection criteria were limited to those diagnosed with or meeting the standards for MetS. This was done to target a population that had the largest increased risk of developing a chronic condition, and intervening at a point most critical for initiating self-health promoting behaviors (i.e., patient engagement) to influence or reverse the potential disease trajectory. It was known that this population was at higher risk for chronic disease than those without MetS condition.

Conditions impacting participation. Patients with other limiting conditions identified through established research methods such as electronic health record diagnosis were excluded. Limiting conditions may have significantly limited their ability to employ healthy patient engagement behaviors that may have impacted and potentially skewed biometric analysis outcomes (i.e., psychological impairments, disease diagnosis, physical or learning impairments). Such psychological conditions would include those that dictate 24/7 patient care and advanced dementia (e.g., Alzheimer's). Disease possibilities

included cancer that was being actively treated and congestive heart failure. If a disease was listed in the diagnosis section and there was a question of whether this might have significantly affected health outcomes and medication adherence, then I consulted with and receive guidance from lead medical providers, Dr. Grace Keenan or Dr. Chris Connolly, of NOVA Medical Group.

Consent, Privacy, and Sampling Frame

Health care providers were given a research identification number so they could be de-identified and correctly associated with their patient group (intervention or control). Patient information and provider information was de-identified and assigned into one of two research groups depending on location and quantity, and in accordance with internal review board criteria. No personal or private health information was associated with patients or providers in this study.

Given the sampling frame of four NOVA Medical Group clinics, the population was selected from those with the following MetS criteria: hyperlipidemia (high triglycerides and high cholesterol) and hypertension. The intent was to enroll 500 participants from the MetS population with approximately 50% in each group so that the sample size would be determined around the parameters of 2.5% margin of error, 90% confidence interval, and standard deviation of .5.

A repeated measures MANOVA was performed and included assessing and comparing one independent variable with multiple dependent variables. Statistical Package for the Social Sciences (SPSS) statistical program was used.

Significance of the Study

It was essential to understand what health care providers can do to motivate their patients to follow treatment plans and engage in their health behaviors. Learning and applying provider-patient engagement tools and skills may be a significant factor in improving patient health outcomes and medication adherence. Patient engagement and healthy behaviors are proven to have the highest impact on improving health outcomes and quality of life (Jacob & Serrano-Gil, 2010; Kones, 2013; Nield, 2008; Wolever et al., 2011). These study outcomes are aligned with patient engagement behaviors that are potentially influenced by the relationship with their provider. How a provider engages with patients during the onsite patient appointment may prove to be a key factor in improving patient health outcomes and medication adherence. It may improve patient awareness, self-health promotion, and improved health. This may have a significant positive impact on patients' quality of life, how they perform their day-to-day activities, and how they are able to meet their personal health goals (e.g., playing with grandkids, running a 5K, working all day without pain, etc.). When patients are educated and empowered to work with their health care providers and take ownership of their health, then a positive ripple effect occurs producing beneficial changes within themselves, their families, their employers/coworkers, their community, and beyond (Engel, 1977; Williams et al., 2000).

This study was based on integrative patient centered provider training that may support results to drive understanding and application of integrative patient engagement methods and practices for those with Met S. The results may provide a platform for

additional patient engagement research to develop a patient engagement protocol and its potential applications. The study may provide processes and information for use in clinics that are already patient centered (e.g., accountable care organizations and patient centered medical homes). Additional benefits may include understanding what provider practices influence patient behavior and what aspects of provider care are important to the patient, all of which may have a direct impact on patients' health-promoting behaviors and well-being.

There is a considerable amount of literature on MetS, patient engagement, and provider education; however, there is limited research on all three in the same study (Ampt et al., 2009; Brady et al., 2010; Burghen, 2005; Fifield et al., 2010; Graham, 2014; Jacobson & Gance-Cleveland, 2011; Karve & Hayward, 2010; Wiley et al., 2015; Xiang et al., 2014). This study may lead to improved patient medication adherence and improved health outcomes, and become a basis from which to approach and treat MetS and reinforce provider-patient engagement efforts. Knowing where to focus time, energy, and finances is critical, especially to health care providers and researchers. Understanding how to best support patient engagement and how to incorporate it into clinical practice workflow via training and best practices around MetS may prove to be an industry-wide, resource-saving, patient health promoting, and provider-friendly health care model (Barello et al., 2012; Bertakis & Azari, 2011; Institute of Medicine, 2001; Rittenhouse, Thom, & Schmittdiel, 2010; Simmons et al., 2014; U.S. Health Care Costs, 2012).

This study had a critical mission to assess the effects of patient centered integrative provider education on MetS patients by identifying whether this training

impacts patient engagement behaviors such that it influences medication adherence and health outcomes.

Summary

Patient engagement includes behaviors that impact lifestyle choices such as nutrition, exercise, stress management, restorative sleep, and pursuit of happiness. With appropriate lifestyle behavior changes, MetS and chronic diseases throughout the U.S. population may be significantly diminished. Primary care providers who develop patient centered engagement skills through furthering their training may be better equipped to influence patient engagement by using patient education and empowerment skills to inspire patients to take charge of their health and medicine. Health care training that provides conceptual and practical application of integrative patient centered care tools may support individual patient engagement health behaviors that in turn may positively impact MetS symptoms. This study has the potential to improve health outcomes, reduce chronic disease, decrease health care spending, and improve the overall life of those suffering with MetS.

In Chapter 2, I present a literature review to provide an in-depth understanding of the theoretical foundation and biopsychosocial model used for this study. I describe strategies for searching the literature, the theoretical framework, and definitions and application of associated aspects of patient engagement, MetS, and medication adherence. It offers a comprehensive understanding of the basis for provider integrative patient centered care, training, and application. Patient engagement was searched and the

results yielded gaps regarding consistent definitions of this term in the health care

industry, thereby prompting further development, defining, and use of this term.

Chapter 2: Literature Review

In this quantitative quasi-experimental study, I examined potential relationships between MetS patients' health outcomes measured in biometrics (blood pressure, triglycerides, BMI, fasting blood glucose, hemoglobin A1c, high density lipoproteins) and medication adherence defined as taking or not taking (EHR noted or patient reported at clinical visit) and providers trained in patient centered engagement practices. This chapter includes literature search terms, the biopsychosocial theoretical framework, limitations of the biopsychosocial model in a primary care setting, patient engagement, MetS association with medication adherence, improved health outcomes, and provider education.

Organization of the Review

Significant studies were examined and integrated into the literature review. The first section presents strategies for searching the literature including search terms around the concepts of biopsychosocial, patient engagement, MetS, and provider education. The next section addresses the biopsychosocial theoretical framework, its evolution from general systems theory to the biopsychosocial construct in patient diagnosis and treatment, and its current application in this study. Views on the limitations of the biopsychosocial model with regards to its lack of comprehensiveness and the practical implications of limited time for use in daily clinical practice are given. Section three provides a definition and criteria for patient engagement in this study. Next an overview on MetS is presented, describing the link between MetS and chronic disease, the high population affected by both, and the lack of research on how provider training may

impact patient engagement and improve health outcomes. Lastly, health outcomes and its correlation with medication adherence are discussed along with integrating provider training to improve both of these factors. The chapter concludes with a summary.

Strategies for Searching the Literature

I used Google Scholar, ProQuest, Sage, PubMed, Thoreau: Multiple Databases, Cochrane database, and books. The literature search focused around four main areas: (a) patient engagement and treatment, (b) MetS, (c) provider education (2009-2015), and (d) biopsychosocial models. Boolean operators were used to refine the search. Key search terms for patient engagement and treatment included *patient engagement*, *personalized care*, *physician patient engagement*, *provider engagement*, *congruence*, *shared decision making*, *adherence*, *compliance*, *patient provider symmetry*, *participatory medicine*, *relationship centered care*, *patient empowerment*, *patient centered*, *collaboration*, *engagement*, and *self-management*. Key search terms for metabolic syndrome included *metabolic syndrome*, *chronic disease*, *metabolic syndrome symptoms*, *hyperlipidemia*, *hyperglycemic*, *pre-diabetes*, *body mass index*, *cholesterol*, and *obesity*. Key search terms for provider education were filtered first by date range 2009-2015 to ensure most recent training protocols and research, and included the following: *provider training*, *provider education*, *doctor education*, *doctor training*, and *provider behavior*; all terms were searched with chronic disease and metabolic syndrome. The key search terms for researching biopsychosocial theory and constructs were *biopsychosocial*, *mind/body medicine*, *mind/body/spirit medicine*, *mind/body treatment*, *mind/body/spirit treatment*,

comprehensive treatment, and *patient centered*. All terms were searched with chronic disease and metabolic syndrome.

Theoretical Framework

I used the biopsychosocial construct based on mind/body medicine in which the intrinsic capacities for disease prevention and healing are supported through integrating understanding of biology, psychology, and social influences into diagnosis and treatment (Bausell & Berman, 2002; Cox, 2011; Engel, 1977; Fremont & Bird, 1999; Freudenreich et al., 2010; Levin, 2009; Montori et al., 2013; Moss, c2003; von Bertalanffy, 1950; Williams et al., 2000). In his outline of general systems theory, von Bertalannffy (1950) described how within a living organism or any system, the whole is made up of interacting components that result in organized complexity, and that independent parts of the organism cannot be studied independently to understand the whole. This seminal work in systems theory laid the foundation for understanding and applying the biopsychosocial model in health care, diagnosis, and treatment.

Biopsychosocial Model

Engel (1977) described the impossibility of understanding illness without understanding the internal and external environment of the patient. This involved the provider engaging with patients to comprehensively assess the multiple facets that affect health. The approach included provider-patient centered engagement skills that take into account the patient's biology, psychology, and social influences that can impact symptoms and disease (Engel, 1977; Freudenreich et al., 2010; Gorgens, 2006; Montori et al., 2013). The integrative patient centered training protocol was comprised of

biopsychosocial training elements that provide education and support skill development with the intention of facilitating patient engagement behaviors to inspire or motivate the patient to improve self-care behaviors such that they positively influence medication adherence and health outcomes.

Cox (2011) built on Engel's biopsychosocial model and included the body/mind/spirit paradigm that supports the "emerging desire for greater multi-professional collaboration…an integrative focus for those who recognized the conceptual limitations of a medical practice based on biomedicine alone" (p. 352). Cox also suggested integrating relationship-based medicine or patient centered care, "which incorporates meaning and purpose (spirit) as well as science and psychology" (p. 352). This contributed to the current understanding and application of the biopsychosocial model in which a provider assesses a patient's biology, psychology, and sociocultural aspects to more comprehensively and effectively diagnosis and treat, which aligns with a patient centered approach to health care and delivery.

Biopsychosocial Model Limitations

Limitations noted here do not diminish the biopsychosocial model's established efficacy in primary care and treatment, but they do address concerns in its comprehensive and effective application. First is the issue of not including basic elements into the patient centered inquiry, like ruling out neuropsychological conditions, becoming more precise in learning the patient's biggest concerns, and realizing that what the patients want and why may be very different from what the provider understands and practices. Second, the application of the biopsychosocial model in a clinical setting using the patient centered

approach takes time. It takes knowledge of information technology and electronic health record systems, knowledge of the classification codes to appropriately link counseling and treatment to codes that align with the biopsychosocial model and reimbursement, and knowledge of creative processes to integrate all of these components into practical workflows in a patient centered care setting. This requires time to train and most importantly time to work in a clinical setting with patients who usually have more than one health care issue to assess. This is not only a huge challenge in a fee-for-service model in which time is limited and the number of patients seen is maximized, but in most health care and delivery models in which time is often a factor and function of reimbursement and revenue.

Adding to the biopsychosocial model. Freudenreich et al. (2010) discussed the application of the biopsychosocial model in clinical settings and its shortcomings and potential improved guidelines. Freudenreich et al., identified three guidelines for clinicians to use when inquiring: "1) Think neuroanatomically; 2) Think existentially; and 3) Think "dirty;" that is, understand that patients and physicians sometimes work toward different goals" (p. 365). This approach still includes the biopsychosocial model; however, providers are using portions of it more judiciously and adding components that had been overlooked by many who employed it (Freudenreich et al., 2010). The biopsycho portion points toward thinking neuroanatomically and finding out whether there is any common neurological condition present if cognitive, behavioral, or affective symptoms are noted. Basically providers want to rule out any biopsycho issue that could impact clinical diagnosis, treatment, patient decision-making, and self-care. However,

with this approach comes the added requirement for physicians to understand what to ask, how to interpret, and how to apply information received into diagnosis and treatment in a timely fashion. It is essential that training, workflow processes, proper coding, and time with patients integrate these additional components.

Thinking existentially is recommended to ask questions that get to the core of what may be bothering the patient without all of the other social questions potentially asked on a patient centered intake. Freudenreich et al. (2010) suggested asking what the patient's biggest fear is based on current life circumstances and that every physician should be able to help patients through "times of loss, fear and uncertainty" (p. 367). Even with this approach it is important not to get engulfed in the patient's problems and suffering but to know enough to support the underlying needs and take time to ask questions, listen, and employ the most aligned and beneficial response and treatment.

The final aspect covered by Freudenreich et al. (2010) is described as "think dirty," the idea that patients may sometimes have ulterior motives for wanting certain treatments or care, not to suggest that patients are bad but to merely to state that a physician must be aware of possibilities not necessarily related to the physician's presumed reasons for the medical appointment (p. 368). Freudenreich et al. noted that a doctor should not try to be everything to his or her patients and that the patient's wants may not align ethically and/or along the lines of how a provider plans to treat; this ensures a provider's training, skills, expertise and ethics are not overridden by a patient's demands, regardless of potential patient backlash.

Not enough time with patients. One of the biggest challenges for health care

providers is not having enough time with patients to adequately perform a comprehensive intake, listen to patients, and provide the counseling and care necessary, especially in a patient centered care setting (Klinkman & van Weel, 2011; Mauksch, 2005; Scherger, 2005; Tilburt et al., 2014). The biopsychosocial model is complex and aligned with patient centered care in which providers take into account the whole patient including family, culture, social aspects, psychology, and biology (Freudenreich et al., 2010, Klinkman & van Weel, 2011; Mauksch, 2005; Scherger, 2005). Having enough time to apply and practice the biopsychosocial model of care presents challenges in understanding the model, incorporating the practice into clinical workflow, and being reimbursed for these patient centered practices.

Patient Engagement Factors

Patient engagement is described as self-health promoting behaviors that influence health outcomes. This health behavior dynamic was the basis for the study. Determining what factors impact patient engagement is important. Research was conducted to determine whether provider patient centered training was a factor in patient engagement, and whether it is necessary to understand one of many potential factors that may impact why and how a patient engages in his or her health care. In the health care industry, there is limited consensus around the term patient engagement, so this literature search was performed to determine the best definition supported by research and aligned with the constructs of this study (Barello et al., 2012; Bertakis & Azari, 2011; DiMatteo et al., 1992; Dunbar-Jacob & Mortimer-Stephens, 2001; Institute of Medicine, 2001). In addition, I searched metabolic syndrome to determine associated symptoms and

biometric values in order to have established standards to ensure reliable metrics and analytical comparisons. Provider education, this study's independent variable, was searched to have a fuller understanding of the potentially positive impact on patient engagement and health outcomes.

Patient Engagement Defined

I used two areas of literature for my patient engagement definition in this study. First, patient engagement is defined by the Agency for Healthcare Quality and Research (AHQR, 2011) as "an ongoing process in which patients take an active role in their own healthcare" and involve factors including "personal skills, motivation, and behaviors-affect an individual's ability to effectively engage in care" (p. 1). Second, Simmons et al. (2014) used this definition in their systematic review of clinical trials on patient engagement. Simmons et al. evaluated 543 abstracts, and only 10 trials met their criteria that defined patient engagement as (a) understanding the importance of taking an active role in one's health and health care; (b) having the knowledge, skills, and confidence to manage health; and (c) using knowledge, skills, and confidence to perform health-promoting behaviors.

Patient Engagement Improvement and Improved Health Outcomes

Out of the 10 trials mentioned above, four were used to measure knowledge, confidence, and skills of patient engagement (Hibbard, Mahoney, Stock, & Tusler, 2007; Lorig et al., 2010; Lorig, Ritter, Villa, & Armas, 2009; Wolever et al., 2010). Five (50%) used chronic disease metrics like the ones used in this study (Barlow, Edwards, & Turner, 2009; Glasgow et al., 2012; Goeppinger, Armstrong, Schwartz, Ensley, Brady, 2007;

Huang, Li, & Wang, 2009; Lavery, O'Neill, Parker, Elborn, & Bradley, 2011). One trial

used a self-efficacy measure (Moriyama et al., 2009). In addition these studies had

behavioral measures, with one measure being medication adherence, which aligns with a

measure that was assessed in this study (Glasgow et al., 2012). Nine out 10 (90%)

reported improved patient engagement (Glasgow et al., 2012; Goeppinger, Armstrong,

Schwartz, Ensley, Brady, 2007; Hibbard et al., 2007; Huang et al., 2009; Lavery, O'Neill,

Parker, Elborn, & Bradley, 2011; Lorig et al., 2010; Lorig, Ritter, Villa, & Armas, 2009;

Moriyama et al., 2009; Wolever et al., 2010).

Aligned with patient engagement improvement there were five studies or 50%

that showed clinical biological outcome improvements (Glasgow et al., 2012; Lorig et al.,

2010; Lorig et al., 2009; Moriyama et al., 2009; Wolever et al., 2010). Specifically

HbA1c, lipids, blood pressure were the same biological indicators this study assessed.

This research, which examined 543 abstracts on patient engagement, narrowed them

down to 10 trials that had three components that were used to frame and support their

research (a) understanding the importance of taking an active role in one's health and

health care; (b) having the knowledge, skills, and confidence to manage health; and (c)

using knowledge, skills and confidence to perform health-promoting behaviors (Simmons

et al., 2014, p. 3). The study supported the correlation between patient engagement and

improved health outcomes and stated, "the role of patient engagement in chronic disease

care is increasingly being cited as critical for improving health outcomes and reducing

costs" (Simmons et al., 2014, p. 12). These 10 trials had the above three components

which drove the criteria and standardization of components that defined this research

protocol. In addition it was the foundational study for directing further research that reported the link between patient engagement and improved health outcomes. The term patient engagement for this research was established based on Simmons et al. (2014) three criteria that also aligned with AHRQ's standard definition. This provided a reliable and valid foundation for use, application and development of this patient engagement concept.

Metabolic Syndrome Delineated

Metabolic syndrome describes a person with three or more symptoms or precursors to chronic diseases (cardiovascular disease, type 2 diabetes, and stroke) (Crist et al., 2012; Dickerson et al., 2011; International Diabetes Federation, n.d.; Ma & Zhu, 2013). The symptoms include, high body mass index, high waist circumference, hyperglycemia, low cholesterol high-density lipoprotein (HDL), and high triglycerides (Crist et al., 2012; Burghen, 2005; International Diabetes Federation, n.d.; Ma & Zhu, 2013). Diminishing the rate of MetS can reduce chronic disease such as cardiovascular and diabetes type II which costs the U.S. over 75% of our nation's 2 trillion spent on healthcare (CDC, 2011).

Association Between MetS and Chronic Disease

The association between MetS and chronic disease has been established by multiple studies. A 2010 study analyzed GE Centricity electronic medical record (EMR) data that captured patient level clinical data from clinical data services (CDS) that used over 133 provider groups containing 7259 physicians at 98 installations and 8.9 million de-identified patient standardized data (Crawford et al., 2010). The study assessed

potential relationships between "obesity and 3 key chronic disease states: type II diabetes, hyperlipidemia, and hypertension. The positive association between obesity and the 3 comorbid conditions in the GE Centricity database is similar to that found for US populations" (Crawford et al., 2010, p.157). A more recent study indicated a significant relationship between symptomatic carotid disease and metabolic syndrome, demonstrating MetS indicators such as high triglycerides, obesity, and high glucose levels are associated with cardiovascular disease (Maksimovic, Vlajinac, Radak, Marinkovic, & Jorga, 2012).

According to the National Health and Nutrition Examination Survey (NHANES) statistics 2002-2006 report, approximately 34% of adults over 20 years old meet the criteria for metabolic syndrome and that MetS increased with age and body mass index (Ervin, 2009). The 40-59 years old of males and females showed a three times higher incidence of meeting MetS criteria than 20-39 year olds. Males over 60 years were four times more likely and females over 60 years were six times more likely over the younger group to meet MetS criteria (Ervin, 2009). A more recent study used the NHANES 1999 to 2010 surveys in two year waves; these indicated that within the U.S. population approximately one-fifth of adults had a cardiometabolic risk (Beltrán-Sánchez et al., 2013). These statistics indicated 34% of adults in the U.S. have metabolic syndrome and one fifth of these adults specifically had cardiometabolic risk (Beltrán-Sánchez et al., 2013; Ervin, 2009). These large study statistics indicated a clear and present need to understand how to diminish MetS to prevent the onset of chronic disease, mortality, morbidity and extreme health care costs.

Diet and Exercise Behaviors Influence MetS

As discussed there was an abundance of research on metabolic syndrome, however gaps were found in best practices and ways to prevent these symptoms (Appel, Jones, & Kennedy-Malone, 2004; Burghen, 2005; Dickerson et al., 2011; Ma & Zhu, 2013). A Cochrane study reviewed the effects of exercise and diet, or exercise only on people at high risk for type 2 diabetes, an indicator of MetS. The study included eight trials with 2,241 participants in the exercise plus diet group and 2,509 participants in the standard recommendation group (Orozco, 2008). Orozco concluded that diet with exercise had a significant effect on those in high risk groups described as those with MetS or impaired glucose tolerance (Orozco, 2008). This meta-analysis was limited in understanding the "effects of exercise and diet on quality of life, morbidity and mortality, with special focus on cardiovascular outcomes" (Orozco, 2008, p.5). However the study used biometric outcomes to measure MetS indicators, and the relationship of diet and exercise behaviors on biometrics associated with MetS.

If providers know methods to motivate patient engagement then positive lifestyle behaviors, (e.g., diet and exercise) may be facilitated. Some providers may not have received training in how best to motivate patients and encourage positive life style behaviors, however training is available now. Research depicts the link between provider training and influence on patient behavior thereby health outcomes, so it is plausible based on the literature that MetS patient engagement behaviors may be impacted by provider training (Ampt et al., 2009; Brady, Solomon, Neu, Siberry, & Parekh, 2010;

Burghen, 2005; Fifield et al., 2010; Graham, 2014; Jacobson & Gance-Cleveland, 2011; Karve & Hayward, 2010; Wiley et al., 2015; Xiang, Wethington, Onufrak, & Belay, 2014).

Another aspect of MetS review was to determine what biometrics were the best indicators of this condition and most commonly collected. These biometrics were: blood pressure, triglycerides, BMI, fasting blood glucose, and/or high density lipoproteins (Burghen, 2005; International Diabetes Federation, n.d.; Ma & Zhu, 2013).

Medication Adherence, Improved Health Outcomes, and Provider Education

Medication adherence and improved health outcomes. Medication adherence is a major contributing factor in improving health outcomes. The World Health Organization (WHO) stated those with chronic conditions have a 50% treatment non-adherence rate (World Health Organization, 2003). The consequences "include worsening condition, increased comorbid disease, increased health care costs, and death" (Chisholm-Burns & Spivey, 2012, p. 826). There are different reasons for medication nonadherence however a shared approach of collaboration and communication between healthcare providers and their patients with aims for a common goal of improved health outcomes may be key (Brunton, 2011; Chisholm-Burns & Spivey, 2012; Khanna et al., 2012; McHorney & Spain, 2011).

A 2014 study using 649,904 patients diagnosed (based on International Classification of Disease 10 codes) with hypertension, 199,312 diagnosed with diabetes and 290,543 diagnosed with hyperlipidemia indicated there were higher hospitalizations with poor medication adherence from patients with hypertension, hyperlipidemia and

diabetes (Han, Suh, Lee, & Jang, 2014). In addition to hospital related medicine nonadherence costs, a study by Khanna, et al., (2012) stated 4 billion prescriptions in the United States were dispensed contributing to 10% of the overall 2.5 trillion in health care costs with approximately half of the medication not taken as prescribed. More important than the financial health care costs are the deaths associated with poor adherence estimated at 125,000 individuals per year, in addition to the adverse effects associated with morbidity (Khanna et al., 2012; Makarem, Smith, Mudambi, & Hunt, 2014). The financial, physical, and emotional ramifications of nonadherence is highlighted by the statistic that half of those who fill a prescription do not continue the medicines after six months (Brunton, 2011; McHorney & Spain, 2011). Medication adherence directly correlates with health outcomes and is a significant challenge. Supporting this component of patient care through provider education and improved patient engagement may positively contribute to improved overall health outcomes.

Provider education. In my research provider education and training will be given in order to promote health care providers' ability to facilitate patient self-healthy behaviors (patient engagement) such as better nutrition, exercise, stress management, restorative sleep, pursuit of happiness and medication adherence (AHRQ, 2011; Brunton, 2011; Chisholm-Burns & Spivey, 2012; Cox, 2011; Engel, 1977; Guarneri & Tager, 2014; Khanna et al., 2012; Simmons et al., 2014; Williams et al., 2000). I will educate on the understanding and application of biopsychosocial and patient centered care practices that include family, culture and social aspects. This training will aim to promote patient engagement around healthy behaviors and medication adherence.

Monitoring patient reported medication adherence is one way to determine if patients are taking what is being prescribed. Improving medication adherence is a factor in reducing morbidity and mortality (Brunton, 2011; Chisholm-Burns & Spivey, 2012; Khanna et al., 2012; McHorney & Spain, 2011). Giving health care providers the tools and training to improve patient engagement and thereby medication adherence is a key factor in determining if training has an influence on patients taking prescriptions. Various ways to improve medication adherence through patient provider relations and communications on supporting health promoting behaviors have been researched (Bosch-Capblanch, 2009; Brunton, 2011; Makarem et al., 2014; Street Jr., 2013; Viswanathan et al., 2012).

This research protocol includes provider patient engagement training and will incorporate a cross-section of researched methods to include promoting cognitive and emotional reasons (utilizing the biopsychosocial patient centered model) for taking prescribed treatments, creating goals that are patient centered, and understanding and integrating health literacy based on demographics and other patient intake information (Bertakis, Klea, 2011; Bosch-Capblanch, 2009; Brunton, 2011; Makarem et al., 2014; McHorney & Spain, 2011Street Jr., 2013; Rittenhouse et al.,, 2010; Viswanathan et al., 2012; World Health Organization, 2003).

Literature searches revealed large amounts of research on MetS, patient engagement, and provider education independently; however information is limited when reviewed together or in different combinations (Ampt et al., 2009; Brady, Solomon, Neu, Siberry, & Parekh, 2010; Burghen, 2005; Fifield et al., 2010; Graham, 2014; Jacobson &

Gance-Cleveland, 2011; Karve & Hayward, 2010; Wiley et al., 2015; Xiang, Wethington, Onufrak, & Belay, 2014). This gap in research on provider education and its potential impact on patient engagement with metabolic syndrome patients drove my proposed research study. Educational programs that advance provider patient engagement skills and how to incorporate these into daily clinical practice may be a wise fiscal and fundamental initiative (Barello et al., 2012; Bertakis & Azari, 2011; Institute of Medicine, 2001; Rittenhouse et al., 2010; Simmons et al., 2014; Kaiser, 2012).

Summary

This literature review listed all significant search terms, the biopsychosocial theoretical framework, and defined patient engagement. Patient engagement factors described included metabolic syndrome, link between MetS and chronic disease, and the large U.S. population affected. I highlighted the lack of research on provider training and the potential impact this could have on patient engagement and medication adherence. Major studies were examined to understand the immense amount of research performed on patient engagement, in addition to the deficiency of research around my proposed study of provider training to improve patient engagement behaviors. The following chapter is an explanation of research methods used to analyze the effects of provider education on patient engagement behaviors and therefore health outcomes and medication adherence.

Chapter 3: Research Methods

In this quasi-experimental study, I examined the potential effects of the independent variable, integrative patient centered provider training, on the dependent variables of health outcomes (biometrics) and medication adherence (EHR noted and physician reviewed at clinical visit) of patients with metabolic syndrome. There is little research addressing the correlation between provider training, patient engagement, and health outcomes. Due to this gap, there was a need for further study. Follow-on studies may enhance generalizability of findings.

This chapter presents the method and design and is organized into five sections. The first section includes the reasoning for using a quantitative quasi-experimental design and the research questions. The next section details the sampling and sampling procedures, including the sampling frame and size. In the third section I identify the dependent variables of health outcomes (disease biometrics) and medication adherence (EHR noted) and the independent variable data (two provider groups). In the fourth section, I describe the ethical considerations and how patient data was de-identified, collected, and protected, as well as how ethical procedures were employed with the provider groups to ensure understanding and agreement. The fifth section presents the instrumentation and materials used. A summary concludes this chapter. The Institutional Review Board (IRB) approval number for this research is 08-14-15-0330260.

Research Design and Approach

I employed a quantitative quasi-experimental design. The purpose was to determine the potential effects of the independent variable (integrative patient centered

provider training) on the dependent variables of health outcomes (biometrics) and medication adherence (EHR noted) of patients with MetS. The metrics aligned with established biometric standards from the International Diabetes Federation and American Medical Association JNC8 (Gionfriddo et al., 2014; International Diabetes Federation, n.d.). The biometrics included the following: (a) hyperlipidemia, metabolic condition causing high triglycerides and high cholesterol; (b) high triglycerides, ≤ 150 mg/dl or treatment for this lipid abnormality; (c) low high density lipoproteins (HDL), > 40 mg/dl in men and > 50 mg/dl in women or treatment; (d) hyperglycemia, a raised fasting glucose ≤ 100 mg/dl or diagnosed type 2 diabetes (International Diabetes Federation, n.d.); (e) hypertension, ≤ 140 mm Hg systolic or diastolic ≤ 90 mm Hg or treatment (Gionfriddo et al., 2014); and high body mass index (BMI) defined as ≤ 30 kg/m^2 and correlated with increased MetS and age (Beltrán-Sánchez et al., 2013).

I compared the efficacy of a patient engagement protocol on medication adherence and health outcomes between two groups: (a) integrative patient centered provider training for providers (intervention group), and (b) no integrative patient centered training for providers (control group). The intent of the intervention groups was to determine the effects of newly administered integrative patient centered provider training on patients with MetS. This comparative effectiveness research analyzed and compared the effects of integrative patient centered care training on medication adherence and disease biometric outcomes of patients with MetS.

Research Questions and Hypotheses

RQ1: Is there a difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic?

H1n: There is no difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

H1a: There is a difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

RQ2: Is there a difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic?

H2n: There is no difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

H2a: There is a difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic.

Health outcomes and medication adherence were the dependent variables, and patient engagement patient centered provider training was the independent variable.

Sampling and Missing Data

Sampling Selection

I used a purposeful sampling protocol based on patients' MetS data. The nature of the sampling frame (such that limited number of patients met the study's inclusion criteria of having six MetS indicators) from NOVA Medical Group clinics, patient randomization was infeasible however provider randomization was feasible. From eight to 10 providers, four to five were used for Group 1 (integrative patient centered care training), and four to five were used for Group 2 (integrative patient centered care training). My sample was obtained through performing two series of patient data filtering. The initial patient data filtering was based on those who had the following study MetS indicators: hyperlipidemia (high triglycerides, high cholesterol) and hypertension. These indicators were selected because they yielded the highest number of patients and produced 515 patient data. A second filtering was performed on this initial set and used the remaining research MetS indicators (HbA1c, fasting glucose, BMI) and produced 91 patient data, which was my applied research sample size. Because patient randomization was not feasible, internal validity was strengthened by random division of providers who had MetS patients; they were placed into two study groups (intervention or control) based on creating comparable patient sample sizes for each provider group (Frankfort-Nachmias & Nachmias, 2008).

Sampling Procedures

The patient data under study met the inclusion criteria of having the MetS symptoms described above. Exclusion criteria included people less than 18 years of age and those with conditions that may have impacted their ability to successfully employ patient engagement behaviors (e.g., psychological or cognitive limiting conditions noted on EHR). Patient information and data and provider information were de-identified and assigned into one of two research groups depending on location and in accordance with internal review board criteria.

The sampling frame was derived from four NOVA Medical Group clinics, and the population was filtered by those having three of the six MetS indicators: hyperlipidemia (high triglycerides and high cholesterol) and hypertension, and then on the remaining three MetS indicators (HbA1c, fasting glucose, BMI) yielding 91 patient data.

Based on this sample size of 91 MetS patients the specified margin of error of 10.0% with a 80% power at 95% confidence level and a standard deviation of .5 with a medium effect. With a confidence level at 95%, this corresponded to a z score of 1.96. To find the sample size needed, I used the following formula. Necessary sample size = (Z score)^2 *StdDev* (1 StdDev) / (margin of error)^2 = $(1.96)^2$ x .5(.5) / $(.10)^2$ = (3.84 x .25) / .01 = .96 / .01 = 96.

With attrition estimated at 30%, the minimum required sample was (96 + 96*0.3 ~ =) 125 patients (Frankfort-Nachmias, Nachmias, 2008).

Missing Data

Missing data could have occurred for multiple reasons. First, providers may have opted out of the training at any point during the study. Another trained provider could have taken over the patient cases if that provider met the group criteria (i.e., received or had not received the intervention training). These potential scenarios should not have affected the study sample size because sample size was based on patient numbers, not number of providers. As long as the providers working with the assigned population had or had not received the integrative patient centered care training, respectively, then all other factors remained constant.

Another potential for missing data was having a provider from one research group following-up with patients originally seen by the other group. Other challenges included, patients that did not return for follow-up appointments within the four month post intervention time frame, and research biometric labs not requested by the provider and/or not performed by the patient.

Overall, 37 patients were assigned to provider Group 1 (intervention) and 54 patient to provider Group 2 (control). It was not possible to obtain data from additional patients to meet the minimum required sample size of 125.

Assumptions

The assumptions for multivariate analysis of variance (MANOVA) were the following:

1. Dependent variables are continuous variables measured at the interval/scale level.

2. The Independent variable clearly divides the study participants into two independent groups (integrative patient centered care training, and one group not given integrative patient centered care training).

3. Each study participant in a group was selected independent of other study participant in the same group.

4. Each group has enough cases based on the minimum required sample size, and the groups are balanced.

5. There are no extreme values (outliers) in the dependent variable and in each of the covariates. In the current study, MetS biomedical parameters had large variances due to their probable large deviations from normal (non MetS) patients.

6. The dependent variable and each of the covariates measured on continuous scale follow normal distribution.

7. There is linear relationships between dependent variable and each of the continuous independent variables.

8. There is homogeneity of variance such that there are similar variances in each of the groups. The assumption was assessed using Pillai's criteria and Box's M test of equality of covariance. The assumption of homogeneity of variance-covariance was not met, and the null hypotheses was rejected.

9. There should be no multicollinearity between continuous independent variables (covariates) and they are not correlated with one another.

Dependent and Independent Variables:

There are seven dependent variables in this study. The biomedical variables include: blood pressure, triglycerides, body mass index (BMI), fasting blood glucose, hemoglobin A1c, and high density lipoproteins. The medication adherence variable is defined as "taking" or "not taking" medication (noted on EHR). The independent/intervention variable is provider education on integrative patient centered care, received or not received.

Dependent: Health Outcomes and Medication Adherence

The effects of patient engagement factors on medication adherence (EHR noted) and disease management outcomes biometrics (e.g., blood pressure, triglycerides, body mass index (BMI), blood glucose serum, HbA1c, and high density lipoproteins) were compared between two patient groups within a health care clinical system.

Independent Variable: Provider Education

Two provider groups were established with respects to the independent variable. The groups were comprised of providers who received integrative patient centered training (intervention), and those providers who did not receive integrative patient centered training (control). The intent of the intervention group was to determine the effects of newly administered integrative patient centered provider training on patients with MetS. This comparative effectiveness research analyzed and compared the potential different effects from integrative patient centered training between provider groups. It analyzed and compared the effects of integrative patient centered training on disease management outcomes and medication adherence, and determined statistically significant

relationships. These outcomes of integrative patient centered engagement training can be compared to other patient engagement efforts to determine levels of effectiveness based on medication adherence and disease management outcomes.

Provider training was developed based on patient centered health care methods shown to improve patient satisfaction and health outcomes. These methods are based on patient centered medical home (PCMH) tenets; accountable care organization criteria; the health belief model; and current research integrating components of building healing relationships, motivational interviewing, and the seek, help, assess, reach, evaluate (SHARE) approach (AHRQ, 2012; Bertakis, Klea, 2011; Guarneri & Tager, 2014; Institute of Medicine, 2001; Rittenhouse et al., 2010; Tilburt et al., 2014; Wolever et al., 2011). There were approximately 65 health care providers in this study to include medical doctors, nurse practitioners, doctors of naturopathic medicine, nutritionists, and nurses; with anticipated 90% participation rate from the practitioners and nurses. The training was a total of six hours divided up into approximately two hour blocks one day a week for three consecutive weeks. I provided the training using audio-visual equipment, PowerPoint presentations, participant role-play, humor, and team engagement. See appendix A.

Data Analysis Plan

Repeated measures MANOVA was utilized to examine how each patient's data compared across the two capture periods. Baseline (pre intervention) patient data was collected from the EHR at the start of active research (post IRB approval). This pre intervention data capture was the last documented biometric and medication adherence

data on patient EHR. Post intervention data (after provider training was given) was collected after the patient's follow-up clinical visit, approximately three to four months after the last training class. Repeated measures MANOVA were performed and included assessing and comparing one independent variable with multiple dependent variables. SPSS statistical program was used for the analysis.

Research Questions

RQ1: Is there a difference in disease biometrics outcomes (blood pressure, triglycerides, BMI, blood glucose: serum glucose and A1c, and high density lipoproteins) in patients with MetS following implementation of a patient engagement provider training protocol in an integrative health clinic?

Below is the example table for delineating the collected biometric data.

Table 1

Example Biometrics Data Collected

Variable	Baseline Mean ± Standard Deviation	Post Intervention Baseline Mean ± Standard Deviation
Provider Training Group		
BMI Kg/m^2		
HbA1c %		
Fasting Glucose mg/dl		
Triglycerides mg/dl		
Systolic BP mmHg		
Diastolic BP mmHg		
HDL mg/dl		

RQ2: Is there a difference in medication adherence (EHR noted or patient reported at clinical visit) in patients with Metabolic Syndrome following implementation of a patient engagement provider training protocol in a health clinic?

Below is the example table for delineating the collected medication adherence data.

Table 2

Example Medication Adherence Data Collected

Variable	Pre Intervention (Baseline)	Post Intervention
Medication Adherence: reported at clinical visit and is compliant or noncompliant		

Ethical Considerations

Patient data de-identified, collected and protected

Patients' data were de-identified by removing all identifying information and replaced with an identification research number. Only the primary investigator and designated NOVA Medical Group (NMG) staff had access to this information. Because initial patient de-identification was performed, no health and personal data was associated

with the data, thus no HIPAA or privacy act violations were probable; therefore consent from patients to use this data was not necessary (this determination was approved by the IRB). The data were kept in password protected electronic files and all methods and procedures around data complied with IRB, HIPAA, Privacy Act, and NMG regulating criteria.

Provider Group Consent

All providers were divided into one of two groups. Those provided the training were given a description of the research and their participator role. Provider demographics were collected to include age, years of practice, degree, and medical school attended, though these details were not integrated into study analysis. All providers were de-identified and given a provider group number (1 or 2) and randomly assigned to the intervention or control group.

Instrumentation and Materials

Biometrics scales and standards were based on industry standards as indicated previously. SPSS software was used to establish analytical testing programs, produce tables and drive interpretation of outcomes.

Summary

In summary this chapter discussed the details and development of my quantitative quasi-experimental study. It showed what research methods and procedures were employed to determine potential effects of the independent variable (integrative patient centered training) on dependent variables (health outcomes) and medication adherence (noted on EHR) of patients with MetS.

Chapter 4: Results

This chapter presents findings of the integrative patient centered engagement training study including patient data, demographics, descriptive statistics, data capture challenges, data compilation, and data analysis. The previous three chapters introduced and described the need for this study, provided an in-depth literature review, and research methods were explained. In Chapter 4, I describe the use of repeated measures MANOVA to test for significant differences between provider groups who had the intervention (integrative patient centered training) and those who did not have the training. In addition, I describe the analysis done across time to determine whether there were significant differences between health outcomes. A summary of findings concludes the chapter.

Research Data

Patient Data Numbers

Initial baseline patient data were collected within 12 months of intervention start date (integrative patient centered training). Metabolic syndrome patient selection criteria were based on a diagnosis of MetS and having baseline data on triglycerides, blood glucose, HbA1c, HDL cholesterol, body mass index, blood pressure, and medication adherence. After clinical chart review for complete post intervention data, the initial sample size decreased from 91 total patient data, with 37 from Group 1 (provider training intervention group) and 54 from Group 2 (control group who did not receive the training), to 43 total patient data with 13 from Group 1 and 30 from Group 2. Due to the diminished sample size an intention to treat (ITT) group was established utilizing

baseline values cared forward. Analysis was performed on both the ITT group using the original 91 patient data, and on the completer data set using 43 total patient data. These two data sets will be described later in the chapter.

Patient Demographics

Age ranged from 31 years to 90 years, with the 46-60 range at 49.5% of participants and 61-75 range at 37.4% of participants. Participants included 61.5% females and 38.5% males. Demographic data are presented in Table 3 and Table 4.

Table 3

Age Range Data Set Comparing Provider Training Group (Intervention) and Non-Provider Training Group (Control)

		Age Range of Patients Per Provider Group				Total
		31-45 Yrs	46-60 Yrs	61-75 Yrs	76-90 Yrs	
Provider ID	Intervention Provider Training Group	3	19	13	2	37
	Control Group Non-Provider Training	2	26	21	5	54
Total (n)		5	45	34	7	91

Table 4

Female and Male Participants

	Number
Female	56
Male	35
Total	91

Descriptive Statistics and Sample Size

The total original sample was 91 with 37 patient data in the provider training group and 54 patient data in the non-training group. Within this initial group of 91, data were missing as indicated by lower numbers next to the biometric collected (see Table 5). Data were analyzed using mean and standard deviation at two points in time, baseline and post intervention measurement 3 to 4 months after intervention (provider training). Descriptive statistics are presented in Table 5.

Table 5

Descriptive Statistics for Research Population

	Baseline Mean ± SD Values
Provider Training Group: Intervention	
BMI Kg/m^2 n = 37	32.92 ± 7.29
HbA1c % n = 36	5.98 ± .40
Fasting Glucose mg/dl n = 36	99.36 ± 11.81
Triglycerides mg/dl n = 35	146.03 ± 81.13
Systolic BP mmHg n = 37	127.43 ± 14.89
Diastolic BP mmHg n = 37	79.46 ± 12.77
HDL mg/dl n = 37	56.16 ± 18.28
Non-Provider Training Group: Control	
BMI Kg/m^2 n = 54	31.51 ± 7.86
HbA1c % n = 48	5.99 ± .93
Fasting Glucose mg/dl n = 53	102.00 ± 37.96
Triglycerides mg/dl n = 48	148.40 ± 65.48
Systolic BP mmHg n = 53	132.26 ± 16.71
Diastolic BP mmHg n = 53	82.59 ± 12.85
HDL mg/dl n = 54	52.69 ± 16.53

Data Compilation and Table

Research Question 1 was applied to both the completer data set (43 total patient

data) and the ITT data set (91 total patient data). The ITT data set used values carried

forward from baseline if the post intervention data was missing or had to be removed

because it invalidated the integrity of provider group. Research Question 2 could not be

answered due to discrepancy of outcomes; data did not achieve criterion validity

standards and construct validity was not met. The definition of medication adherence was

not consistently followed across patient EHRs, thus not reliable. If incorporated, results

would have been skewed and/or completely inaccurate. This finding is discussed in

Chapter 5.

Research Questions and Hypothesis

Research Question 1 assessed if there was a difference in disease biometrics

outcomes (blood pressure (systolic and diastolic), triglycerides, body mass index (BMI),

blood glucose (HbA1c and serum), and high density lipoproteins) in patients with

Metabolic syndrome following implementation of a patient engagement provider training

protocol in an integrative health clinic. The null and alternative hypotheses described if

there was or was not a difference in disease biometrics outcomes following implantation

of the patient engagement protocol.

Data Compilation and Completer Data Set

The completer data set had a total of 13 patient data from the provider training

group, and a total of 30 patient data from the nontraining group. It was noted that the

small sample size could increase the likelihood of type II errors and a failure to reject a

false null hypothesis (Creswell, 2009; Frankfort-Nachmias & Nachmias, 2008). Mean

and standard deviation values were analyzed at two points in time, the baseline and at

three to four months post intervention. Within the completer data set, statistically

significantly ($p < 0.05$) values across time included a decrease in BMI within the provider

training Group 1 (from 35.14 ± 7.9 Kg/m^2 to $33.65^* \pm 7.62$ Kg/m^2; p value for

difference < 0.05; Table 6); but not within the non-training Group 2 (32.4 ± 6.62 Kg/m^2

to 32.4 ± 6.5 Kg/m^2; p value for difference > 0.05; Table 6). There was an increase in

fasting glucose levels in both provider groups: training Group 1 (from 99.00 ± 12.84

mg/dl to $104.46^* \pm 20.12$ mg/dl; p value for difference < 0.05; Table 6) and non-training

Group 2 (from 101.33 ± 13.40 mg/dl to $105.47^* \pm 18.60$ mg/dl; p value for difference

< 0.05; Table 6). However, there was no statistically significant difference in BMI

between the training (intervention) and non-training (control) groups ($p = 0.469$).

Table 6

Completer Data of Biometric Data Between Provider Groups

	Baseline Mean + *SD* Values	Post Measurement Mean + *SD* Values	*F* Statistic
Provider Training Group			
n=13			
BMI Kg/m^2	35.14 ± 7.87	33.65* ± 7.62	3.86
HbA1c %	6.07 ± .45	5.92 ± .34	2.88
Fasting Glucose mg/dl	99.00 ± 12.84	104.46 *± 20.12	4.28
Triglycerides mg/dl	164.15 ± 110.77	151.00 ± 84.54	.188
Systolic BP mmHg	129.46 ± 21.87	128.92 ± 21.18	1.816
Diastolic BP mmHg	81.08 ± 18.81	79.44 ± 18.71	.009
HDL Cholesterol mg/dl	51.54 ± 19.97	51.54 ± 18.93	.039
Non Training Group			
n=30			
BMI Kg/m^2	32.42 ± 6.96	32.13 ± 6.53	1.73
HbA1c %	5.91 ± .42	5.83 ± .45	.309
Fasting Glucose mg/dl	101.33 ± 13.40	105.47* ± 18.60	.082
Triglycerides mg/dl	150.70 ± 70.57	154.37 ± 66.30	.592
Systolic BP mmHg	136.80 ± 16.88	130.77 ± 15.60	1.27
Diastolic BP mmHg	81.42 ± 11.04	82.47 ± 11.90	.184
HDL mg/dl	53.70 ± 18.80	54.77 ± 20.14	.177

Note. * Significant from baseline at $p \leq 0.05$

Repeated measures MANOVA was performed with the completer data set. Provider training group (intervention) and non-training (control) as the between subject variables and time as the within subject variable, with two time points (pre and post intervention).

Time has a statistically significant effect on fasting glucose level, such that fasting glucose level significantly (F (1, 4) = 4.28, p < 0.05) increased over time. In addition, a statistically significant (F (1, 4) = 3.86, p < 0.05) effect was found between follow-up times and BMI for the training group (but not for the non-training group). Therefore, time had a statistically significant effect on BMI in the training group alone, but as stated previously there was no statistically significant difference between the provider training groups. Because significance was only noted between time frames and not between provider groups for both fasting glucose and BMI, the null hypothesis (there was no difference in disease biometrics outcomes in patients with metabolic syndrome following implementation of a integrative patient centered provider training protocol) was not rejected. Also found, for the training group, the longer length of clinical care received by patients (if all other conditions are kept constant) the lower patient's BMI. This suggests that training may have favorable effects on the outcomes, but not large enough to be statistically significant.

Data Compilation and Intention to Treat

One method used to overcome data capture complications was to create the intention-to-treat (ITT) data set. Baseline data were carried forward to fill in the missing

or invalid data from both provider groups creating a whole data set with a total 91

patients. ITT data is a conservative estimate that is commonly used in clinical research

when attrition is noted (Gupta, 2011). When comparing the mean value, I examined

standard deviation and standard error pre and post intervention on the completer data set

($n = 43$), and the ITT data set ($n = 91$). The difference in means between data sets of

provider groups (pre and post intervention) showed no significant variation between

groups and no similarities of either upward or downward trending values.

The ITT data set had a total of 37 patient data from the provider training group

and 54 total patient data from the nontraining group. ITT statistics are presented in Table

7.

Table 7

Intent-to-Treat Analysis of Biometric Data Between Provider Groups with F *Statistic*

	Baseline Mean + *SD* Values	Post Measurement Mean + *SD* Values	*F* Statistic
Provider Training Group			
n=37			
BMI Kg/m^2	32.92 ± 7.29	31.64* ± 6.84	8.37
HbA1c %	5.98 ± .39	5.91 ± .38	2.85
Fasting Glucose mg/dl	99.59 ± 11.73	101.11 ± 16.37	.003
Triglycerides mg/dl	144.89 ± 79.16	143.16 ± 64.78	.002
Systolic BP mmHg	127.43 ± 14.89	129.62 ± 16.13	.292
Diastolic BP mmHg	79.46 ± 12.77	76.86 ± 14.1	.703
HDL Cholesterol mg/dl	56.16 ± 18.26	54.08 ± 18.09	.270
Non Training Group			
n=54			
BMI Kg/m^2	32.16 ± 6.65	31.49*±6.28	.810
HbA1c %	5.99 ± .88	5.94 ± .89	.019
Fasting Glucose mg/dl	105.76 ± 31.08	104.52 ± 17.93	.257
Triglycerides mg/dl	150.94 ± 66.31	152.19 ± - 61.94	.086
Systolic BP mmHg	131.48 ± 17.52	131.02 ± 15.84	.689
Diastolic BP mmHg	82.24 ± 12.98	81.55 ± 12.45	.235
HDL mg/dl	52.69 ± 16.53	53.48 ±17.74	1.355

Note . * Significant from baseline at p ≤ 0.05.

Repeated measures MANOVA was performed with ITT group. Provider training Group 1 (intervention) and non training Group 2 (control) as the between subject variables and time as the within subject variable, with two time points (pre and post intervention). Furthermore, the intervention (integrative patient centered training for health care providers) has no statistically significant effect on BMI (Table 7) such that the BMI for the patients whose health care providers received integrative patient centered training and the BMI for the patients whose health care providers did not receive integrative patient centered training did not differ to a statistically significant degree. In addition, a statistically significant ($p < 0.05$) relationship was found between length of clinical care for both provider groups and BMI such that (if all other conditions are kept constant) the longer the length of clinical care received by a patient, the lower his/her BMI.

Within the ITT data set statistically significant values across time included a decrease in BMI in both the provider training group and nontraining group. However, similar to the completer data set, there was no statistically significant difference in BMI between the training and non-training groups in the ITT set (Table 7). While the completer data set suggests possible (but not statistically significance) favorable effects of the training, the ITT data set does not. Overall, I failed to reject the null hypothesis (there was no difference in disease biometrics outcomes in patients with metabolic syndrome following implementation of a integrative patient centered engagement provider training protocol).

The medication adherence research question 2 involved research measurement criteria and outcomes data that ended up unreliable and invalid due to the pre intervention definition and criteria of "not taking" on the electronic health record not being consistent across patient EHRs. Due to this significant discrepancy within the medication adherence measurement definition, RQ 2 was excluded. This finding is discussed in Chapter 5.

Conclusion

I conducted this study to determine whether integrative patient centered training given to health care providers had an influence on patient behavior and health outcomes. This potential influence was measured based on two research questions, one addressing biometrics and one addressing medication adherence, pre and post intervention training. Due to reliability and validity confounding factors, Research Question 2 on medication adherence could not be answered.

The inconsistencies between the two data sets (completer and ITT) may be attributed to the current study time frame and sample size limitations. Therefore, the "implementation of a patient engagement provider training protocol" has more noticeable effect on patients' biometric outcomes with MetS within the completer set compared to the ITT data set.

For research Question 1, analysis of completer and ITT data sets showed there was no statistically significant difference of biometric outcomes, that means I failed to reject the null hypothesis, and conclude that based on the current data and available information there is no difference between the training and the non-training provider groups.

Chapter 5: Discussion, Recommendations and Conclusion

The purpose of this study was to determine whether integrative patient centered training for health care providers influenced how patients understood and took care of their personal state of health (patient engagement), thereby improving their health outcomes. These health outcomes were measured through assessing bio data of patients with metabolic syndrome (MetS). Specifically I analyzed their chronic disease biometrics (triglycerides, fasting glucose, HbA1c, BMI, high-density lipoprotein, BP) and medication adherence. In this chapter I explain the data capture challenges including medication adherence analysis, data collection, and sample size attrition. Two areas of significance are discussed regarding the outcomes data: a decrease in body mass index and an increase in hyperglycemia. Demographics and the reasons why age ranges instead of specific ages were used are explained. In addition, current trends regarding MetS, provider training and education, and health care and delivery models are explored. I also examined how these trends may lead to facilitating social change and its relationship with the dynamic health care environment including how trends are both the drivers and outcomes of ongoing social change. Limitations of this study are examined to better understand the challenges and their impact. I address the latest research and lack of research on the effectiveness and efficacy of training providers to improve patient health outcomes. In conclusion I consider recommendations for further research and discuss academic, research, and clinical opportunities around integrative patient centered care.

Discussion: Data Capture, Significant Outcomes, Trends,

Social Change, and Limitations

Data Capture Challenges

This study had two research questions; Research Question 1 (RQ1): Is there a

difference in disease biometrics outcomes (blood pressure (systolic and diastolic),

triglycerides, body mass index (BMI), blood glucose (HbA1c and serum), and high

density lipoproteins) in patients with MetS following implementation of a patient

engagement provider training protocol; and Research Question 2 (RQ2), is there a

difference in medication adherence (EHR noted or reported by patient) in patients with

MetS following implementation of a patient engagement provider training protocol?

The capture challenges for RQ1 included multiple confounding factors such as no

control or incentives for facilitating patient return for appointments, and no control over

patients following up on appointments with a different provider. The capture challenge

for RQ2 was that the definition of medication adherence and the term "not taking" on the

electronic health record were not applied consistently across patient EHRs which in turn

negatively impacted outcomes data making it unreliable and invalid.

Research Question 1: Bio Data and Data Capture Challenges

Challenges in collecting patient data occurred at the 3-4 month point post

intervention training. One challenge was patients returning for a follow-up appointment

did not always return to the original provider group they were initially assigned, thus

making their post-intervention data invalid. Out of 91 patients, 11 saw a different

provider and their initial data capture had to be carried forward as intention-to-treat (ITT)

group while disregarding their actual post intervention data, this supported the integrity of the provider group while maintaining a higher sample size. Allowing this ITT group to be created disallowed the attrition factor that would have eliminated 11 patients' data or having 8.27% of patient data unusable.

A second challenge centered on providers not ordering and collecting all research biomedical labs previously captured for their baseline data. Triglycerides, fasting blood glucose, HbA1c, HDL cholesterol, BMI, BP, and patient reported medication adherence were initially captured. Attempts were made after 3 to 4 months post intervention to capture the same data; however, the provider did not always request some of these labs, or if labs were requested they were not always completed by the patient. This brought the total number of patients with complete data (all biometrics from both the initial baseline capture and post intervention capture) to 13 patients from provider training group and 30 from nontraining group.

A third challenge was that some patients did not return for a 3-month follow-up appointment; therefore, no post intervention data were available. This lack of data and high attrition rate had a significant impact on the ability to effectively analyze and produce reliable and generalizable outcomes. However, creating the ITT data set and bringing initial values forward allowed for the intervention group to remain at 37 and the nonintervention group to remain at 54.

Research Question 2: Medication Adherence and Data Capture Challenges

At the onset of protocol development, the electronic health record medication adherence note termed "not taking" was defined as the patient had chosen not to take the

medication and was noncompliant with doctor's orders. When post intervention outcomes data were collected, I observed that the "not taking" EHR note for medications sometimes referred to the medication not being taken were actually replaced by a similar but not identical medication for the same condition, and all within doctor's orders. Upon further scrutiny and discussions with the physicians, I learned that "not taking" could have various meanings. It could mean that the physician stopped the prescription or the patient decided it was not indicated. For example, if it was a pain medication, the patient took it only as long as needed; the patient could stop based on his or her own volition, and it would later be discontinued by the physician in the EHR. Another example, a patient was prescribed a different medication for the same condition due to various reasons, and then the originally prescribed medication was listed as not being taken, instead of stating that it was switched due to allergy, expense, not effective, or other reasons that complied with doctor's orders.

The original understanding and definition given for "not taking" and what was discussed in Chapter 3, was, patients who decided not to take his or her prescribed medication for his or her own reasons and without physician consent. If this definition was consistent for every "not taking" note in the EHR medication note, then accurate data could have been collected and it could have been discerned that medication not taken was due to the patient making the decision without consult with his or her physician. However, as described above, that was not the case.

Due to the inconsistent application of this definition for the medication adherence dependent variable, criterion validity standards and construct validity were not met. This

instrument of measurement was neither reliable nor consistent, and results would have been skewed and/or completely inaccurate. Therefore, Research Question 2 and the associated data were excluded from this study.

Significance of Outcomes Data

Intention to treat group (ITT). Only time had a significant effect on one dependent variable (BMI). BMI decreased significantly over time in both the ITT provider groups. The ITT data set demonstrated a slight decrease of BMI between the intervention and control provider groups, but it was not statistically significant. In addition, there was no statistically significant differences between within subjects (time) or between subjects (groups) with the other dependent variables (disease biometrics).

The ITT provider training Group 1 ($n = 37$) demonstrated a statistically significant ($p < 0.05$) decrease in BMI from 32.9 ± 7.2 Kg/m^2 to 31.6 ± 6.8 (Table 7). The non-training Group 2 ($n = 54$) demonstrated a statistically significant ($p < 0.05$) decrease in BMI from 32.2 ± 6.7 Kg/m^2 to 31.5 ± 6.3 Kg/m^2 (Table 7). Although statistically significant reduction in BMI was observed with ITT data, no statistically significant difference was observed when comparing the training and non-training groups to assess the effects of the training on patients' BMI.

Completer Group. Time and training has a statistically significant $p < 0.05$ effect on body mass index (BMI). BMI decreased significantly over time and but there was no statistically significant difference between the training groups. Also, time has a statistically significant $p < 0.05$ effect on fasting glucose in both provider groups.

Provider training Group 1 (n=13) demonstrates an increase in fasting glucose

99.00 ± 12.84 mg/dl to $104.46*$ of $\pm$ 20.12 mg/dl (Table 6) and non-training Group 2

(n=30) demonstrates an increase in fasting glucose from 101.33 ± 13.40 mg/dl to $105.47*$

± 18.60 mg/dl (Table 6) and (F (1,4) = 4.28, p < 0.05. It was noted that glucose increased

over time in the completer data set but not in the ITT data set. This fasting glucose

finding has no impact on the study due to no statistically significant differences between

study groups.

The completer data set shows there is no statistically significant difference p >

0.05 with BMI between provider training groups ($n = 13$). Within the provider training

Group 1 BMI decreases from (35.14 ± 7.86 Kg/m^2 to 33.65 ± 7.62; Table 6) however,

with nontraining provider Group 2 there was no statistically significant (p > 0.05) change

(32.4 ± 6.62 Kg/m^2 to 32.4 ± 6.5 Kg/m^2; p = 0.469; Table 6). Therefore "implementation

of a patient engagement provider training protocol" has no statistical significance on

disease biometrics outcomes in patients with metabolic syndrome within the completer

data set.

Discussions on Outcome Findings

According to the annual American Health Association (AHA) assessment for

2015, hyperglycemia and waist circumference have been increasing and trending upward;

however, high triglycerides and blood pressure have been decreasing (Mozaffarian et al.,

2015). The hyperglycemic data from the AHA study aligns with these outcomes;

however, no details as to why this may be occurring have been determined. Factors that

may influence fasting glucose values and ability to compare values reliably, include not

knowing whether the patient did in fact fast and the time of day the labs were drawn.

Decreased BMI levels in both groups were most likely attributed to the treatment approach for MetS patients, and in this case a specific focus on obesity and prediabetes. All but two patients who had a decrease in BMI also had elevated HbA1c and/or elevated glucose levels and were most likely being treated for prediabetes as well as obesity. The two patients who did not have elevated HbA1c were borderline high glucose with 5.5 mg/dl, and for fasting glucose had levels 95 and 85 mg/dl. The standard treatments for obesity and prediabetes include increased physical activity, diet low in sugar and fatty foods, behavior and lifestyle changes, and in more resistant cases prescription weight loss medication, weight-loss surgery, and diabetes medication (American Diabetes Association, 2016; Mayo Clinic, 2016; NHLBI, n.d.). Patients who had elevated BMI were most likely treated for prediabetes and were put on a more aggressive treatment approach that may have led to a decrease in BMI for both groups.

Tae-Young Pak, Ferreira, and Colson (2016) found that BMI and incidence of obesity are still increasing steadily in the United States and are population-wide issues. However, certain demographics showed an increasing prevalence of obesity including Hispanics, Blacks, elderly, and females (Campbell et al., 2016; Krueger, Coleman-Minahan, & Rooks, 2014; Tae-Young Pak et al., 2016). Health care costs increased significantly when BMI went from Class 1 obesity ($30 \leq$ BMI to < 35) to Class 2 and 3 (BMI ≤ 35) (Cawley, Meyerhoefer, Biener, Hammer, & Wintfeld, 2015). Keeping obesity levels at Class 1 or lower where health care costs are not rising means lower health care costs, less comorbid conditions, and fewer required medications (Cawley et

al., 2015; Tae-Young Pak et al., 2016). A small decrease in BMI if held constant or maintained would reduce health care costs and improve health outcomes.

Demographics

The demographics were analyzed by age range and not specific age based on previous National Health and Nutrition Examination Surveys (NHNES) that included a meta-analysis using this age range approach within the metabolic syndrome patient population. To have comparable measures of age, age range was collected and assessed. My data showed a downward trend in MetS symptoms from the 46-60 age range to the 61-75 year range, which was opposite from the National Health and Nutrition Examination Survey (NHANES) 2002-2006 report, which indicated approximately 34% of adults over 20 years met the criteria for metabolic syndrome and that it increased with age and body mass index (Ervin, 2009). The reason for this difference may be my smaller sample size, or that the MetS population may be reversing symptoms and becoming healthier since 2009. However, a follow-up assessment by NHANES in 2015/2016 has not been published.

Trends in Metabolic Syndrome

According to Aguilar, Bhuket, Torres, Liu, and Wong (2015), metabolic syndrome prevalence from 2003 to 2012 has been stable. However, it is still a significant issue on many fronts with 35% of adults and 50% of adults over 60 having MetS (Aguilar et al., 2015). Possible improvements in MetS may be associated with greater patient awareness and closer attention to lifestyle behaviors (Aguilar et al., 2015; Beltrán-Sánchez et al., 2013). Patient awareness may be a result of health care providers taking

more time to understand and collaborate with their patients on better lifestyle choices, or

patients independently choosing a healthier lifestyle. The reasons are difficult to identify.

Part of this difficulty may be attributed to pharmaceuticals that control symptoms like

high blood pressure and hyperglycemia, so lifestyle choices and behaviors may not have

changed but medication adherence may have improved. Also, not having reliable data to

accurately compare patient's data to another's is an ongoing challenge due to how MetS

symptom values are defined, how MetS is defined, and how improvements are defined

(e.g., does better health mean better bio values, better quality of life described by

patients, or a combination?).

Though improvement in MetS is the goal for a healthier population and reduced

health care costs, according to a NHANES report (2002-2006) 34% of the total

population still have MetS. The burden on patients and their quality of life, including

finances, still needs focused attention, research, and ongoing dynamic solutions. In

addition, the extreme burden on the U.S. health care system is requiring millions of

dollars not only to treat the MetS patients with medications and therapies but to bear the

burden of caring for those too sick to maintain an at-home sustainable lifestyle (Beltrán-

Sánchez et al., 2013; Cawley et al., 2015; Mozaffarian et al., 2015).

Trends in Training Providers

Provider-centric strategies. According to the American Health Association's

2015 statistical update the following areas of provider centric strategies are an ongoing

focus in the efforts to prevent and treat cardiovascular and associated comorbid

conditions such as diabetes, obesity, hyperglycemia, low HDL, and high triglycerides,

(those with MetS and at greater risk of serious and costly chronic conditions) (Mozaffarian et al., 2015). These areas are defined by the Institute of Medicine (IOM) using six domains, and include shaping health care systems to incentivize and facilitate provider efforts to improve not only the health factors (e.g., bio markers of MetS) but also the health behaviors of their patients. The IOM reports that supporting healthy behaviors such as nutrition and increased physical activities is essential especially with those at greater risk of developing a more serious chronic conditions, such as those with MetS (Dickerson et al., 2011; Mozaffarian et al., 2015;Spieker et al., 2015). Training health care providers in understanding and applying patient centered approaches to patient care can be part of this health care system's approach to reach its goals of improved patient wellness.

Training within academia. Patient centered team based care with a focus on quality and safety has been a dedicated movement within the health care industry and highlighted by the Institute of Medicine Report Crossing the Quality Chasm (Institute of Medicine, 2001). This report helped drive improvement within the medical education system and development of Entrusted Professional Activities (EPA) that translate competencies into medical practices. It takes into account knowledge, skills and attitudes across the work a family physician performs and the competency domains they are required to integrate (AMA. n.d.; Bhuyan et al., 2014; Shaughnessy et al., 2013). It also aligns with follow-on continuing education and keeping the provider aware of and integrating the latest needs in health care and delivery. This focused structured training includes flexible competency-based pathways, teaching new content in health systems

sciences, working with health care delivery systems in novel ways, making technology

work for learning, envisioning master adaptive learner, and shaping tomorrow's leaders;

it encompasses concepts of team-based care, patient provider engagement and efficiency

of systems and assumes another building block to provider's initial and ongoing

education (AMA, n.d.; Bhuyan et al., 2014; Shaughnessy et al., 2013).

Efficacy of provider training to improve health outcomes. Training health care

providers is used successfully in other areas of patient population's treatment and care

but limited research is found within the MetS population. Patient populations such as the

disability population (Iezzoni & Long-Bellil, 2012); mental illness (Byrne, Willis, Deane,

Hawkins, & Quinn, 2010; Caruso et al., 2013); pediatrics (Jacobson & Gance-Cleveland,

2011; Xiang, Wethington, Onufrak, & Belay, 2014); and trauma patients (Green et al.,

2015) showed improvements in health conditions where physicians were trained in more

patient centered counseling approaches. In addition, a study with fibromyalgia patients

demonstrated providers trained in shared decision making (SDM) had significantly better

provider patient engagement, however health outcomes did not show improvement

(Bieber et al., 2006).

Though not working with specific MetS population, a recent study by the military

utilized physicians already trained in patient centered medical home approaches who

focused on obesity prevention in military populations (pregnant women and those post

boot camp) which showed a positive trajectory of patient health outcomes, however the

final study is not complete (Spieker et al., 2015). Another study by Ampt et al. (2009)

discussed provider education and attitudes that may have impacted lifestyle risk factors.

Specifically, attitudes of practitioners were described as having an influence over why they decided to assess their patients for conditions such as alcoholism. Some providers felt certain assessments were to be done only during a formal health check, so many health components were not even considered during other clinical appointments. Also diet and exercise were sometimes inferred by patient appearance and only addressed if overweight. In addition the practitioner's feelings regarding their effectiveness and influence over their patients were considered an attitudinal factor that might impact the patient's motivation towards lifestyle changes (Ampt et al, 2009).

Specific studies with chronic disease and/or MetS patient populations included provider education that focused on including verbal, visual, and written approaches which increased the ability to more effectively communicate with their patients (Towner, 2008). One of the most promising chronic illness studies focused on physician practices and medical home models. The study was based on three national surveys from 2006 to 2013 and included 538 medical groups and independent practice associations; it stated increasing practices' ability to engage patients and their families in their own care may be fundamental to advancing patient engagement (Wiley et al., 2015). Patient engagement was my research study's focus, however the outcomes did not reject the null hypothesis. Other research supports the need for increased provider's ability to improve their patients' engagement (Ampt et al., 2009; Spieker et al., 2015; Wiley et al., 2015). This research supports my premise around improving lifestyle behaviors and the patients' state of health through more patient centered approaches in treatment and care.

Shared Decision Making (SDM) is a term often used in association with patient centered care, patient provider engagement, and other practices that focus on the relationship between the provider and patient (Tapp et al., 2014). It is found that providers and patients may have different goals for the patient's treatment and care, and without effective collaboration between provider and patients, low or no SDM can lead to inadequate chronic pain management (Frantsve & Kerns, 2007; Tilburt et al., 2014). The concept and practice of patient centered care is supported through multiple federal, state, and local medical and health care associations and their initiatives and policy.

These initiatives include the AMA's new resolutions to promote evidence based lifestyle medicine and interventions in treatment of disease as the first primary mode of prevention, and a focus on the need for patient centered health care provider training (AMA, n.d.). The National Academy of Sciences has five core competencies every physician should incorporate: provide patient centered care, work in interdisciplinary teams, apply quality improvement, and utilize informatics (Summit, Greiner, & Knebel, 2003). There are movements and programs throughout the U.S. and other countries utilizing numerous methods to advance the patient centered care model. This patient centered model and approach, though not standardized in the industry yet, is being promoted as a worthwhile model to implement into practice and integrate into the health care delivery payer models. The challenges around efficacy and effectiveness includes producing evidence-based research showing the benefits to health outcomes and reduced costs across systems.

In conclusion on trends in training, a meta-analysis that assessed the value of medical provider training showed that patient centered training was effective in improving providers' patient centered skills (Dwamena et al., 2012). The effect on patient satisfaction and healthy behaviors were mostly positive, however health outcome improvements were not consistent. These inconsistent "improved outcomes" were a running theme within understanding the effects of patient centered care and provider training overall, and support justification of continued research (Ampt et al., 2009; Wiley et al., 2015; Spieker et al., 2015; Towner, 2008).

Trends in Health Care and Delivery Models

Trends in health care delivery models have emerged from both a grassroots patient/consumer driven demand and provider demand to practice more satisfying medicine; and a top down policy driven trend facilitated by the Accountable Care Act (ACA), AMA, Healthy People 2020, National Prevention Strategy, and Institute of Medicine's Crossing the Quality Chasm. The ACA is facilitating initiatives to improve patient experience, health of the population, and reducing costs per capita, called the accountable care organization's triple aim focus. The ACA also includes promotion of the medical home model that emphasizes coordination of care and patient satisfaction (Daly, 2013).

The National Prevention Strategy, Healthy People 2020 and the Institute of Medicine Crossing the Quality Chasm lay out goals and criteria to get the people of our nation healthier and happier; while conveying the urgency to make changes due to the epidemic of chronic illness which does not discriminate between race, gender, and age

(Healthy People 2020, 2014; Health and Human Services, 2016; Institute of Medicine, 2001). In addition the continued increase of health care costs impact our nation, our economy, our businesses, our individual expenses, and quality of life (Daly, 2013). The CDC stated the rate of chronic disease such as obesity, cardiovascular, stroke, and cancer is increasing and accounts for 75% of our nation's 2 trillion spent on health care. This spending makes chronic disease the lead factor in current health care expenditures, in front of technology, prescription drugs and administrative costs (CDC, 2011; Kaiser, 2012). The above trends reflect both the outcomes and the drivers of social change in our dynamic health care environment; from patient and provider satisfaction, to decreasing health care costs, to federal policy development focused on disease prevention, patient centeredness, and equitable treatment reimbursement.

Social Change

This study has a critical mission, to assess the effects of patient centered integrative provider education and clinical practice application with their MetS patients through identifying if training influenced patient engagement behaviors and thereby medication adherence and health outcomes. It provides a basis for an innovative, effective inspiring model of health care and delivery based on promoting healthy provider patient relationships in order to facilitate patient engagement and gain positive health effects. However what may faciliate the greatest social change is simply working towards understanding what matters most to patients in order to motivate positive lifestyle behaviors and allowing providers the time and reimbursement to practice patient centered health care.

Training health care providers specifically in the conceptual and practical application of integrative patient centered engagement can in turn help the provider maintain a satisfying practice. As this component of health care and delivery is understood, delineated, and correlated with improved patient engagement it may be an additional practice that gives providers requisite skills to empower their patients towards motivated self health care and medication adherence and the provider towards a more fulfilling practice. This approach to understanding and incorporating new health care practices is a paradigm shift in the U.S. and represents social change.

Overall this study reflects social change on two fronts, positively influencing quality of life for both the patients and providers. If patients' overall health improves and there is less need for medications, emergency procedures, and chronic disease care then health care costs for these conditions will presumably decrease. Social change for this research revolves around patients feeling better and becoming healthier based on the providers' ability to engage their patients and influence positive behavioral changes. Specifically, health care training that provides conceptual and practical application of integrative patient centered engagement tools may support individual patient engagement health behaviors that in turn may positively impact MetS symptoms. These social changes have the potential to improve health outcomes, reduce chronic disease, decrease health care spending and improve the overall life of those suffering with MetS and those providing the care.

Limitations

The quality of bio data outcomes may have been impacted by multiple factors to include labs not being taken at the same time of day and under the same conditions such as fasting. Medication adherence data were found to be unreliable due to the original definition and criteria of "not taking" on the electronic health record not being consistent across MetS patient EHRs. This significant discrepancy within the medication adherence measurement instrument necessitated Research Question 2 and its data to be excluded.

The sampling size significantly diminished from a 515 to 91patient data due to initially filtering MetS patients on three of the six dependent variables (triglycerides, HDL, and BP), when first assessing the sample environment; then filtering utilizing the remaining three variables (fasting glucose, HbA1c and BMI) to obtain the research sample. In addition, capturing post intervention data were limited by patients not coming back for their follow-up appointments, not getting provider requested labs, and patients not having their follow-up clinical visit within their original provider group. The sample size did not meet the minimum requirement of 125, even with establishment of the ITT data set.

Another limitation revolved around the term patient engagement and the various definitions still used within the health and medical industry. Even though this research was based on the combined definitions from the Agency for Healthcare Quality and Research (AHQR) and Simmons et al, (2014)'s systematic review study, the literature review and in depth research had to involve numerous other related terms in order to capture most of the research around this topic. The challenge included filtering out data

and information that did not meet definition criteria, and extrapolating from the literature pertinent information necessary for understanding and performing this research.

In summary, biometric limitations included knowing if a patient had fasted and performed labs at a certain time of day, which may be a challenge for any similar research protocol. Filtering sample size by all variables under study is a process that can be performed in the future for more precise initial sample data numbers. Also, understanding how medication adherence is defined and understood across all patient medical records and medical scenarios would facilitate greater use of this impactful health factor. Overall, the most challenging limitations around this patient engagement study was defining and utilizing the term patient engagement. Further refinement and research must be conducted in order to establish a consistent generalizable term that can be used reliably across the industry in research, academia, and clinical practice.

<div align="center">**Recommendations**</div>

Recommendations for further research around patient engagement and medication adherence are indicated from this study. Although my medication adherence research could not be utilized, the current negative impact on health and finances due to medication noncompliance strongly suggest further research is warranted. In addition, based on my review and research of patient engagement and provider training, specifically within the MetS patient population, there are significant health benefits and knowledge to be gained from follow-on research.

The population's health and wellbeing in the U.S. is benefiting from this integrative patient centered care movement and paradigm shift from a disease centric

reactive health care system to one based on prevention, whole-person health, and collaboration. Metabolic syndrome patients engaging in their care and healthy lifestyle choices is essential to improved health and better quality of life; and providers practicing compassionate effective care will continue to be a contributing factor. As the Patient Centered Outcomes Research Institute and the Agency for Healthcare Research and Quality develop models, frameworks, and approaches that align provider training with reliable and patient centered approaches, follow-on research can be conducted producing evidence-based outcomes that will be understood and incorporated throughout the health care system. Through incorporating evidence based models of integrative patient/family/community centered care, improved population health and exceptional individual quality of life can be achieved.

Conclusion

This study assessed the effects of a patient engagement provider training protocol on patient engagement and whether there was an effect on patient health outcomes and medication adherence. Due to validity and reliability issues medication adherence could not be assessed. Two groups of patients were compared, those that had clinical visits with providers trained on integrative patient centered care (intervention group), and providers not trained on integrative patient centered care (control group). Two areas of literature were used to define patient engagement for this research. First, patient engagement defined by the Agency for Healthcare Quality and Research (AHQR), "an ongoing process in which patients take an active role in their own healthcare" and involve factors including "personal skills, motivation, and behaviors-affect an individual's ability to

effectively engage in care" (AHRQ, 2011, p.1). Second, Simmons et al. (2014) used the definition in their systematic review of clinical trials on patient engagement as (a) understanding the importance of taking an active role in one's health and health care; (b) having the knowledge, skills, and confidence to manage health; and (c) using knowledge, skills and confidence to perform health-promoting behaviors (p. 3). Together these definitions shaped and drove the research.

There are many approaches and techniques used to describe new and old ways to develop "bedside manner" in order to improve the relationship between provider and the patient to support patients in their lifestyle behavior choices. Patient centered techniques in the field include: shared decision making (SDM), SHARE by NCQA, motivational interviewing, facilitating congruence, collaborative care, patient provider symetry, participatory medicine, relationship centered care, building healing relationships, patient centered care, teach back, health literacy awareness, and others (Barello et al., 2012; Bertakis, Klea, 2011; Cox, 2011; Gionfriddo et al., 2014; Jackson, Tucker, & Herman, 2007; Williams et al., 2000). There are multiple models of health care and delivery from which to incorporate these techniques such as: patient centered medical home (PCMH), accountable care organizations (ACO), community centered health homes, medical/health homes and others in our forward progressing health care arena (Daly, 2013; Peek, 2010; Rittenhouse et al., 2010). Regardless of the integrative model employed or patient centered approach used, at the most fundamental level it is beneficial for providers to strive to know their patient and to know themselves for best outcomes.

Provider training was given to promote health care providers' ability to facilitate self-healthy behaviors (patient engagement) with their patients; such as better nutrition, exercise, stress management, restorative sleep, pursuit of happiness and medication adherence (AHRQ, 2011; Brunton, 2011; Chisholm-Burns & Spivey, 2012; Cox, 2011; Engel, 1977; Guarneri & Tager, 2014; Khanna et al., 2012; Simmons, et al., 2014; Williams et al., 2000). Eventhough there was no statistically significant relationship between provider groups (training/non-training) and patients' immediate health results, many integrative patient centered skills were taught and potentially practiced by the providers, yielding promising favorable health outcomes.

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Appendix A: Integrative Healthcare Patient Centered Patient Engagement Training

(Color divides three training sections taught during three separate dates)

1. **Integrative Patient Centered Healthcare -**
   a. **Escape Fire Film**
   b. **Industry definitions (Clinical, Academia, Research)**
   c. **NOVA Medical Group definition**
2. **Patient Engagement**
   a. **Definitions in industry**
   b. **Training definition**
3. **Health Literacy**
   a. **Defined**
   b. **Necessity (Culturally/Linguistically)**
   c. **Current Issues/Challenges: Health Disparities**
4. **Mission, Vision, Values**
   a. **Yours**
   b. **Company's**
   c. **Optimal**
5. **Your Patient Engagement Style**
   a. **Emotional Intelligence**
      i. **Your role in prevention and health promotion (knowledge & attitude)**
      ii. **What you do well**
      iii. **What you want to do better**
   b. **Style**
      i. **Conscientious**
      ii. **Direct**
      iii. **Influencer**
      iv. **Steadiness**
   c. **Building Awareness**
      i. **Building Healing Relationships**
      ii. **Motivational Interviewing**
      iii. **SHARE Approach**
   d. **Limitations, Challenges, Obstacles**
      i. **Enough time with patients**
      ii. **Clinical inertia**
   e. **What Motivates you**
      i. **Job well done**
      ii. **Pay incentives (pay for performance, time off)**

     iii. **Patient feedback (to provider and public/work recognition)**
   f. **Your optimal Patient Relationship**

6. **Patient Intake & Application**
   a. **Questions & Comfort Level (lifestyle, intimacy, nutrition, family health history/relations)**
   b. **Shared Decision Making (SDM)**
   c. **Educating /Motivating Patient (understanding main issue, treatment & personal goals, follow up at 1-3 months).**
   d. **Electronic Health Record Integration**
   e. **In house referrals and complementary therapists**
   f. **Working as an integrated team (processes for)**
   g. **Workflow – Bringing it all together**

ANGELA MCCONNELL

CURRICULUM VITAE

Q Integrative Healthcare LLC &

Northern Virginia Veterans Association, 501(c)3

Angela@IntegrativeHealthVA.com & President@NovaVets.org

OWNER / CONSULTANT
COMMUNITY SOLUTIONS

Developing & Collaborating to Establish Patient Centered Healthcare

Innovative business leader experienced in implementing collaborative community health partnerships and integrative patient centered care programs and policies for the healthcare community. Experience includes working with public/private medical centers, Veteran/military programs and initiatives, academic institutions and information technology systems.

Leadership experience across all levels of healthcare and military with emphasis on management, patient centered care, quality, safety, workflow efficiency and multi-site operations. Expert in identifying gaps and needs in healthcare, understanding how to educate and build upon systems strategy by leveraging resources and capabilities.

Lead Industry Speaker ≈ National Summits, Hospitals, DoD Centers of

Excellence, Chambers of Commerce, Congressional Councils, Veterans Service

Organizations, Departments & Associations & Public Health Initiatives

Chairperson ≈ Prince William Chamber of Commerce Health Council

Board of Directors / Advisor ≈ Providing insight and expertise to agencies

and organizations on veteran and health-centric issues

President/CEO and Founder ≈ Northern Virginia Veterans Association

PROFESSIONAL EXPERIENCE

Q Integrative Healthcare LLC Owner, Woodbridge, VA, 2009 – Present.

Integrative Healthcare subject-matter expert providing consultation and support. Strategic development of collaborative community-wide health/medical/wellness partnerships. Consulting, creating and implementing integrative healthcare infrastructure, programs and policies. Utilizing leading-edge research, analytics, and innovation to create efficient collaborative health systems focusing on improving health outcomes, reducing costs and sustaining a culture of continuous improvement.

- Leads healthcare stakeholders in resource sharing and partnerships as Chairperson, Prince William Chamber Health & Wellness Council. Focused is placed on local, state and federal policy issues, workplace wellness and healthcare reform. Stakeholders include hospital systems, medical providers, insurance companies, employers and employee-consumers.

- Partnered with ABC 7 and United Way on multi-media Veterans Hiring Campaign. Provided support in developing, organizing and networking nonprofit, government & private sector organizations to determine employment challenges in order to provide a continuum of services in support of Veteran/family success across National Capitol Area.
- Developer and instructor of continuing education on integrative healthcare and community collaboration topics that include: integrative healthcare models, integrative patient centric practices, trauma/post traumatic stress disorder, military culture/ medical resources, workplace wellness and community partnerships/networks.

Northern Virginia Veterans Association (Founder)

President/CEO (Jan 2015 – Present)

Local Resources to Support Our Local Veterans. Founded and began developing NOVA Veterans in 2013. It has a distinct and necessary mission being a hands-on, non-profit that connects veterans & military families, at no cost, to a vast system of community resources addressing needs to support & improve their quality of life. This service organization is different such that it provides a comprehensive continuity of support, follow-up and case management. It is **not a referral agency nor navigation service**, but a quality control organization that coordinates support through select trusted partners. Through this structure our partners connect and learn about each other, breaking down the silos in order to build a responsive, efficient and caring community.

- Founded because no other organization was providing guidance, comprehensive support and case management through this complex and confusing web of services
- Nationally almost half of veterans surveyed didn't know how to get the services and benefits they deserve and have earned
- 22 Veterans a day commit Suicide

On-going veteran & community awareness to action campaigns for Northern Virginia, to provide information and resources: 1) Determining local veteran resources, 2) Identifying local veteran needs and creating solutions, 3) Providing a rally point for veteran volunteers to support other veterans in our local community, 4) Performing widest veteran outreach & support. www.novavets.org

Consultation & Capture Management Medical/Healthcare (2012/2013)

Provides comprehensive contract management capture, proposal strategy, and comprehensive subject matter expert support for Applica Solutions (SDVOSB).

New Business Consulting / Business Development (2011/2012)

Provides innovative policy and program infrastructure for the National Aesthetic Accreditation Agency, the first medical aesthetic accreditation agency. Integrates new state regulations to support legal, safe, quality standards for all medical aesthetic practices. Incorporates transparent competitive marketing with a patient centered focus.

Counter Terrorism/Force Protection Reserve Officer (June 1994 – July 2009 retired) Major, *United States Air Force Europe,* Ramstein

Germany. Provided integrated, multi-discipline intelligence to satisfy warfighter requirements for all phases of military operations. Monitored and analyzed activities in conjunction with military/political crisis situations. Developed strategic mission-essential threat assessments and plans, in partnership with civilian & military leadership.

Project Manager FDA (May 1991 – May 1993) *Ebon Research*

Systems: Food and Drug Administration, Laurel MD. Managed and lead thirty plus biomedical research employees in new bio-hazardous facility. Prepared and implemented all standard operating procedures covering personnel, biohazard regulations, research materials and equipment. Ensured research protocols, personnel, and facility complied with federal, state and local laws, policies and regulations.

Manager/Technologist – U.S. Army Active Duty (January 1987 – May 1991)

Sergeant, *Walter Reed Army Medical Center / Armed Forces Institute of Pathology* Washington D.C., biomedical research support. *Uniformed Services University of the Health Sciences* Bethesda MD, managed critical research division. Practiced and directed technologists on procedures for research protocols. Supported and educated investigative staff and medical student body in medical / surgical procedures and techniques. (Inactive Ready Reserves June 1991-May 1994)**.**

EDUCATION

◈ Walden University, **PhD Health Administration Candidate**, 2016
◈ Ohashiatsu Institute, **Shiatsu Acupressure Graduate**, Nov 2004
◈ Troy University, **Masters of Public Administration**, Dec 1999
◈ University of Maryland, **B.Sc. Microbiology**, July 1992

BOARD OF DIRECTORS & PROFESSIONAL ASSOCIATIONS

◈ George Mason University College of Health and Human Services Advisory Board
◈ Federal Congressional Health Advisory Council & Veterans Advisory Council Member

- Board of Director Virginia Alliance of Information and Referral Systems
- Board Veteran Advisor to the Prince William County Government Area on Aging
- Military Officer Association of America & Reserve Officers Association
- Prince William Chamber of Commerce: Health & Wellness Council, Government Affairs, Veterans Council, Nonprofit Council

AWARDS AND DECORATIONS

- NOVA Veterans Assoc., Prince William Living Giving Back Award – 1st Runner Up 2015
- 2015 Catherine Spellane Citizen of the Year, Dale City Civic Association
- Prince William Chamber of Commerce Business of the Year 2013
- President's Volunteer Service Award from the President's Council on Service and Civic Participation 2009
- USAFE Outstanding Air Reserve Field and Company Grade ISR Officer of the Year (Jan 2007, Jan 2006, and Jan 2003) – Awarded for outstanding leadership and exemplary improvements to war fighting capabilities
- Meritorious Service Medal – Awarded 9 Sept 2005 for distinguished meritorious service as Counter Terrorism Analyst, United States Air Forces in Europe Theater Air and Space-operations Center, Germany

CLUBS/ACTIVITIES

- Team Red White & Blue (Veterans/Military Health and Fitness) & Ride to Recovery (R2R)
- Ballroom / Latin Dance
- Bikram Yoga / Triathlons
- Rolling Thunder Rider

SPEAKER, VOLUNTEER, EDUCATOR, INNOVATOR

◈ Monthly speaking engagements to include: 2016, Area on Aging, veteran panels, healthcare panels, Prince William Chamber Medical Panel on Innovation (July 2015)

◈ Military Culture & Healthcare Resources Training – Hospitals, Clinics, Medical Providers

◈ Association for Defense Communities National Summit - Expert Panel Speaker on Medical Community Partnerships (June 2014);

◈ Chamber of Commerce Speaker and Moderator multiple events (2011-Present)

◈ Wounded Warrior Mentor Program: Serving wounded warriors and their families, Fort Belvoir, Quantico, Walter Reed Bethesda (Jan 2011 - Present)

◈ DCoE Psychological Health & Traumatic Brain Injury: Air Force Reserve, briefed and advised leadership on Integrative Healthcare and its comprehensive application and benefits to the military (July 2009)

◈ Walter Reed Army Medical Center CAUSE/TOR contract coordinator for Mologne House Grant Program: Hiring, training and providing credentialed complementary practitioners for military outpatients and family members (Oct 2008 – Oct 2009)

◈ Army's Force Health Protection Conference: Developed and presented information and education brief on The Benefits of Shiatsu/Acupressure Integrative Complementary Therapy for Post Traumatic Stress Disorder (Kentucky 2007).