NURSE PRACTITIONERS’ KNOWLEDGE, ATTITUDES, AND PERCEPTIONS REGARDING IRRITABLE BOWEL SYNDROME AND TREATMENT

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ABSTRACT

Study aims were to examine: a) knowledge level of primary care nurse practitioners (NP) regarding Irritable bowel syndrome (IBS) pathophysiology, appropriate diagnosis, and evidence based treatment; b) primary care NPs’ perceptions and attitudes regarding caring for adult IBS patients; and c) correlations between primary care NP’s knowledge level, perceptions, and attitudes and sociodemographic variables including age, gender, years in practice as a primary care NP, and nursing education level.

This descriptive, cross-sectional study used a survey design. The investigator-created, 39-item, 4-part survey assessed sociodemographic data, knowledge level, attitudes, and perceptions of NPs providing primary care for patients with IBS. The survey tool used a six-point Likert type scale, multiple choice options, and 2 open-ended questions. Following university IRB approval, the survey was administered via SurveyMonkey™ through the Florida Association of Nurse Practitioners (FLANP). Statistical analysis included descriptive statistics, one-way ANOVA, and independent samples t test. SPSS (version 24, 2016) computer program was utilized for data analysis.

A completed survey was returned by 64 NPs yielding a 0.06% response rate. Knowledge
scores were low (M = 2.44; SD = 0.869) for pathophysiology, diagnosis, and treatment. Modest agreement was noted for attitude (M = 4.02; SD = 0.59) and perception (M = 4.41; SD = 0.58) scaled questions scores. Education level, years of NP experience, and age had no relationship with knowledge levels. No difference in knowledge, attitudes, and perceptions was seen between MS/MSN and DNP prepared NP’s regarding IBS diagnosis and treatment. Ninety-six percent of participants reported a need for further education regarding IBS.

Reported knowledge deficit regarding appropriate care for IBS patients is an important finding, because this deficit may be related to unnecessary office visits and increased healthcare costs. Further research is warranted to examine these potential outcomes. Participants reporting non-adherence to international clinical guidelines for IBS is a key finding. No significant relationship between NP years of experience and IBS knowledge was found, although there has been reported high frequency of annual primary care visits for IBS. Study participants (98%) recognized their need for additional IBS education, thus making the case to develop and test targeted educational interventions.
Dedication

This scholarly project is dedicated to Christopher, Kylie, Damon, and Ayrton Purdy, you inspire me in all endeavors. Without your unending love and devotion, I would never have had the courage and strength to complete this scholarly project. It is forever my hope that you will have a passion for learning and expanding your horizons.

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Chapter I
Description and Statement of Problem

Irritable bowel syndrome (IBS) is a chronic functional gastrointestinal (GI) disorder with no organic pathophysiology that often presents with abdominal pain and altered bowel patterns. Irritable bowel syndrome is the most prevalent of the functional GI disorders with a diagnosis rate of 10-15%, which equates to 2.4-3.5 million annual provider clinic visits in the United States (US) (International Foundation for Functional Gastrointestinal Disorders (IFFGD), 2016). It is also the most commonly diagnosed disorder by gastroenterologists and accounts for 12% of annual primary care visits in the US. Total estimated annual societal cost for functional GI disorders is 21 billion dollars (IFFGD, 2016). Specifically, for IBS patients, costs for outpatient visits, drugs, and diagnostic testing are reported to be 51% higher than for other functional GI diagnoses (Olafsdottir et al., 2012). Irritable bowel syndrome poses significant direct and productivity related cost burden to the US healthcare system through increased hospitalizations, outpatient visits, emergency room visits, procedures, and medication usage (Inadomi et al., 2003).

Irritable bowel syndrome poses diagnostic and clinical management challenges. Irritable bowel syndrome-related symptoms are the second most common reason for primary care visits after respiratory tract infections (Chey, 2015). Diagnostic challenges regarding IBS arise from overlapping symptoms and clinical signs, which include abdominal pain, borborygmi, bloating, diarrhea, and malabsorption (Grace et al., 2013), as well as, limited definitive diagnostic testing, insufficient treatment approaches, and not using or using incorrectly best practice guideline established by the Rome criteria (Brennan et al., 2010). The Rome criteria were established to
assists the clinician with GI disorder diagnosis. The Rome Foundation generated these diagnostic
criteria for functional GI disorders, which were validated by global expert consensus (Drossman,
2016). Evidence-based guidelines suggest that IBS could be diagnosed correctly at first clinic
visit if the Rome criteria were used together with an appropriate history and physical
examination.

Many primary care providers (PCP), who are unfamiliar with the Rome criteria, diagnose
IBS by exclusion (Gikas et al., 2014). Diagnosis by exclusion poses significant concerns for both
PCPs and patients. Diagnostic tests including laboratory studies (e.g., serum markers, stool
studies, and breath testing), radiographic imaging, esophagastroduodenoscopy, capsule
endoscopy, and colonoscopy need to yield negative findings to rule out IBS-related symptoms.

Irritable bowel syndrome is a chronic condition requiring long-term management of
symptoms, which can often lead to frustration on the part of the patient and the PCP (Gikas et al.,
2014). This produces a counterproductive patient-PCP partnership that does not allow the strong
therapeutic relationship that is necessary for effective symptom management (Gikas et al., 2014).
Primary care providers often have difficulty implementing successful IBS long term treatment
plans that are time intensive for the PCP related to complex IBS patient management issues
(Olafsdottir et al., 2012). Patient satisfaction with IBS health care may be impaired due to these
complex care challenges (Olafsdottir et al.). Identifying barriers to PCPs’ correct knowledge of
diagnosis and treatment, and assessing their perceptions of and attitudes regarding managing IBS
could lead to improved IBS patient management and patient satisfaction.

**Background and Significance of Problem**

The pathophysiology of IBS is poorly understood, which adds additional diagnostic
challenges. Historically, the focus has been on alterations in GI motility and visceral
hypersensitivity. However, recent studies have examined the etiologic role of inflammation, alterations in fecal flora, bacterial overgrowth, and food sensitivity in IBS (Wald, 2016).

Disruptions to the normal GI homeostatic mechanisms, such as motility, absorption, and the inflammatory process, may lead to altered control of enteric bacterial populations (Dukowicz et al., 2007). This leads to dysbacteriosis, which is an imbalance in the natural microbiome, and inflammatory processes altering morphology and function of the digestive system potentiating systemic complications (Miazga et al., 2015). In the healthy status, the gut microbiota interacts with the human host allowing the bacteria an environment to grow while the bacterial ecosystem contributes to maintain homeostasis within the host (Distrutti et al., 2016). When dysbacteriosis occurs from disruption in the natural microbiome physiologic functions such as gut development, nutrient processing and digestion, immune cell development and immune responses, resistance to pathogens, control of host energy and lipid metabolism, and brain development and function become grossly disrupted (Distrutti et al., 2016).

Systemic complications from disturbances in the gut microbiota and inflammatory processes manifest as macrocytic anemia, osteoporosis, rosacea, fibromyalgia, Gastroesophageal Reflux Disease (GERD), malabsorption concerns, Non-Alcoholic Fatty Liver Disease (NAFLD), and cholelithiasis. These potential comorbidities, in addition to the significant disruption in daily life for these patients, also have ethical, legal, financial, and safety ramifications. The disruption of absorption and motility greatly potentiates complications from the aforementioned systemic sequelae. Importantly, symptoms related to IBS, which include psychological distress, impair health-related quality of life (HRQoL). Patients with IBS report greater impairment in HRQoL than patients with gastroesophageal reflux disease, diabetes, and end-stage renal disease (Monnikes, 2011).
Current IBS treatments violate several ethical principles. For example, treatment of IBS-related GI symptoms with non-evidence based empirical antibiotics potentially places patients at risk for opportunistic infections such as Clostridium Difficile (C. Diff), thus violating the principle of non-maleficence. Recognition of potential adverse effects, allergic reactions, and poor response should remind providers that treating just for treatment sake does not serve the best interests of the patient. Additionally, the ethical principles of beneficence and fairness are violated because non-pharmacological treatments, such as specialized diets, are often overlooked as viable treatment options. Food intake has been reported to cause or worsen patients’ GI symptoms in 89.6% of IBS patients compared to 55% of healthy patients (Hayes, 2013). Patient identification of food triggers in IBS poses intriguing clinical research questions regarding whether dietary intervention would decrease IBS exacerbations and subsequent empirical antibiotic therapy in this patient population. This lack of consideration of dietary inclusion as a viable treatment option limits treatment choices for patients.

Legal implications including litigation are increasing due to incorrect diagnosis, exposure to unnecessary procedures, inadequate symptom management, and progression of comorbidities. Irritable bowel syndrome patients are more likely to undergo abdominal surgery, and have three times the rate of cholecystectomy and two times the rate of appendectomy and hysterectomy as non-IBS patients (Charapata et al., 2006). The highly litigious mentality of US patients may be a key motivator for PCPs to perform extensive unnecessary diagnostic testing (Brennan et al., 2010).

Lastly, it is important to note that IBS patients experience significant wage loss due to missed days of work (Olafsdottir et al., 2012). This financial strain poses intense disruption to patient management, outcomes, and adherence, as well as, a resulting overall negative effect on
HRQoL. Additionally, the medical cost incurred and lost wages due to missed work for the IBS patient greatly increase via additional complications and exceed the previously stated $21 billion in annual costs for functional GI disorders (IFFGD, 2016). The indirect costs of IBS, which are largely borne by the employer, have been estimated to be as high as $20 billion annually (Cash et al., 2005). However, given that this estimate is based on costs associated with IBS patients who sought medical attention, the indirect costs may be significantly higher than current best estimates (Cash et al., 2005). It is important to note that health care costs regarding IBS also expand into several domains including societal cost for underinsured patients and increased cost to employers for health insurance coverage. These factors provide a strong case for the DNP prepared advanced practice nurse to be cognizant of IBS pathophysiology and evidence-based treatment to provide appropriate care to these patients. The DNP prepared advanced practice nurse is also positioned to be a key member of the interdisciplinary research team to test efficacy of standard care and novel treatments for this population.

There is a dichotomy among primary care MDs and gastroenterologists regarding diagnosing IBS patients. Gastroenterologists have greater knowledge and utilize Rome criteria more often with functional GI patients. Primary care providers, however, often wait to refer until after standard diagnostic testing (serum markers, stool studies, and radiographic imaging) is complete.

The disproportionate acceptance of the Rome criteria by gastroenterology experts as compared to PCPs significantly disadvantages patients with IBS. Moreover, lack of adoption of the Rome criteria leads to inappropriate clinical decision-making and lack of confidence in diagnostic skills among PCPs. Inappropriately extensive time for IBS diagnosis, ineffective empirical treatment, poor symptom management, and decreased HRQoL highlight the need to
identify barriers to care for the purpose of improving patient outcomes. The Rome criteria has a potentially positive predictive value for IBS of greater than 98% when red flag symptoms (fever, GI bleeding, weight loss, anemia, and abdominal mass) have been excluded (Franke et al., 2009).

Nurse practitioners have assumed a significant role in primary care throughout the US and research indicates that NPs provide high quality patient care leading to patient outcomes that are comparable or better than physician colleagues (Stanik-Hutt et al., 2013). An important role of the NP is providing primary care to the patient with IBS. It is unknown whether NPs provide specialty referrals more quickly than MDs. Although the literature identifies specific practice deficits with primary care MDs regarding IBS diagnosis and treatment, there remains a gap in the literature regarding this topic for primary care NPs. It is unknown if NPs practicing in the primary care setting have similar or different approaches to providing care to the IBS patient compared to the primary care MD. Thus, it is imperative to identify primary care NPs’ knowledge of IBS and evidence-based treatment, as well as, their perceptions of and attitudes towards providing care for this patient population. Identification of knowledge deficits would elucidate education needed to increase acceptance of appropriate use of the Rome criteria.

**PICOT Framework**

Components of the research question were formulated using the PICOT framework. The sample was drawn from a population (P) of NPs who provide primary care to patients with IBS. The project design did not require an Intervention (I) or Comparison (C). Outcomes (O) included identification of knowledge level, perception, and attitudes regarding IBS and treatment. Timeframe (T) for the project survey administration was two weeks.

The primary purpose of this study was to examine the knowledge level of primary care NPs regarding IBS pathophysiology, appropriate IBS diagnosis, and evidenced-based treatment
for IBS and related symptoms. The second aim was to examine primary care NPs’ perceptions of caring for adult patients with IBS. The third aim was to examine primary care NPs’ attitudes regarding caring for adult patients with IBS. The fourth aim was to examine correlations between primary care NPs’ knowledge level, perceptions, and attitudes and socio-demographics variables of research interest including age, gender, years in practice as a primary NP, and education level. Specific barriers to NPs providing appropriate care for patients with IBS will be identified. Identification of specific gaps in knowledge of appropriate care for IBS patients could inform a future DNP prepared nurse-led study designed to examine the effect of an educational intervention on the knowledge level, perceptions, and attitudes of NPs who provide primary care to this population.

**Organizational Needs Assessment**

There is no specific physical study setting because this project is designed to have the Florida Association of Nurse Practitioners (FLANP) disseminate an electronic SurveyMonkey™ to primary care NPs, who are members of FLANP. The DNP scholar performed an adequate investigation into the organizational structure, willingness, and readiness of the FLANP to perform the needed study procedures to assure successful collaboration and study conduct.

The FLANP is a pro-active group of NPs and health care advocates, who are working to improve access to health care for Florida's citizens (FLANP.org). The FLANP organizational mission is to eliminate all barriers to NP practice in the state of Florida. Although this mission manifests primarily as legislative initiatives, there is a strong focus on practice improvement and education of NPs, which is evident in cultural artifacts, espoused beliefs, and basic assumptions of the organization.
Practice guidelines and recommendations are clearly displayed on the FLANP website prior to updates of legislative efforts. This denotes an expectation pattern of practice excellence greater than scope of practice initiatives. Additionally, the FLANP website highlights the primary care provider shortage within the state and promotes use of NPs as a means to address this shortage. The website also presents testimonials of patient satisfaction with and benefits of NP led care. The educational focus together with the stated purpose of improving access to healthcare provides a pro-NP thematic atmosphere. Therefore, this organization presents an optimal collaboration opportunity for scholarly project conduct because the project focus is examining NPs’ knowledge level, perception, and attitudes regarding IBS and treatment. Furthermore, partnership with the organization requires dissemination of the project findings through their newsletter and annual conference. This expectation further supports the FLANP’s interest in improving both provider and patient outcomes.

**EBP Model of Implementation and Theoretical Framework**

Evidence based practice (EBP) uses data regarding efficacious treatments to inform patient care decisions to improve care processes and patient outcomes (Stevens, 2013). The utilization of an EBP model aids in translating research into practice. Identification of practice barriers allows for future improvement in quality of care and practice for IBS patients. Quality health care is achieved through reducing illogical variation in care by standardizing all care to scientific best evidence (Stevens, 2013). Therefore, the use of an EBP model is imperative to achieve health care quality. The EBP model for this project is the ACE Star Model of Knowledge Transformation (STAR), developed by Kathleen R. Stevens (AAHS, 2013).

The STAR Model highlights barriers encountered when moving evidence into practice and designates solutions based in EBP. The STAR Model uses a five-component approach, each
component comprising a point on the star figure (AAHS, 2013). These five points include discover, evidence summary, translation to guidelines, practice integration and process outcomes evaluation. The initial two points are the focus of this DNP scholarly project, and are addressed. Findings from this project may lead to future research following the subsequent steps. This EBP model may promote progression from this initial inquiry towards high quality care for this patient population. The background information for this scholarly project falls under the first Star Model point, Discovery, and encompasses the description of the problem, significance and background, the PICOT question, and the initial literature review. The next point in the EBP Star model is the evidence summary. An appraisal of evidence found through a comprehensive literature review using key terms from the PICOT question allowed the DNP scholar to ascertain the quality, quantity, and consistency of reported research. The DNP scholarly project survey elucidated current practice evidence among NPs and identified deviations from EBP in the NP sample that require attention. These points on the Star Model provided guidance to identify and integrate knowledge level, perceptions, and attitudes of NPs regarding IBS and treatments, and provided opportunity to evaluate and disseminate findings systematically.

A theoretical framework aids in guiding a proposed project. The theoretical framework is implemented once the translation of research findings has been identified. The body of evidence highlights the current gap in practice as compared to evidence based practice guidelines for IBS. The author elected to utilize the Neuman System Model throughout the project. The Neuman System Model, developed by Betty Neuman, is an open framework allowing for easy integration and interpretation. Neuman stated in 2011, “It is widely used throughout the world as a multidisciplinary, holistic, and comprehensive guide for excellence in education, research, and administration. Its concepts, processes, and theoretical base are relevant to complement future
emerging health care trends and issues (neumansystemsmodel.org)”. The Neuman Theoretical framework provides a methodical approach for research and supports the application of evidence gleaned from research into practice.

Components of the framework included assessment, diagnosis/identification, goal, planning, and implementation. The completed assessment phase of this scholarly project interpreted the evidence, which is necessary to identify goal components to be addressed in future research. Thus, the openness of this framework provides the background rational for future practice integration and implementation from the EBP model.

**Definition of Terms**

**Functional Gastrointestinal (GI) Disorders:** Gastrointestinal conditions wherein diagnostic procedures such as laboratory testing (serum markers, stool studies, breath testing), radiographic imaging, esophagogastroduodenoscopy, capsule endoscopy, colonoscopy yield negative findings to account for the symptomology (Drossman, 2016)

**Irritable Bowel Syndrome:** A symptomatic motility and sensory disorder of the lower GI tract, characterized by abdominal pain or discomfort associated with irregular bowel movements and the absence of detectable structural abnormalities (Andresen et al., 2015).

**Dietary Therapy and/or Medical Nutrition Therapy:** A diet plan prescribed by a health care provider or registered dietician to improve health. Several health conditions are treated in part with therapeutic diets. Treatments involve including foods that improve specific health conditions, while avoiding foods that may make the condition worse (Renee, 2015).

**Knowledge Level:** The NP’s understanding of IBS pathophysiology, appropriate IBS diagnosis, and evidenced based treatment for IBS and related symptoms as measured by the survey questions to fulfill the primary purpose of this study.
**Perception:** The NP’s thoughts or opinions on whether IBS is a chronic disease, severity of IBS, HRQoL, patient self-management of symptoms, and patient knowledge regarding IBS as measured by the survey questions to fulfill the second aim of this study (www.merriam-webster.com).

**Attitudes:** The NP’s confidence or feelings towards diagnostic acumen, patient satisfaction, treatment time requirement, provider satisfaction, and practice strategy regarding IBS as measured by the survey questions to fulfill the third aim of this study (www.merriam-webster.com).

**Primary Care Providers (PCP):** NPs who provide primary healthcare to patients with IBS.

**Cross Sectional Study Design:** A non-experimental research design that looks at data at one point in time, that is, in the immediate present (LoBiondo et al., 2010).
Chapter II

Introduction to Search Criteria

A literature review was conducted to elucidate background information on primary care of IBS and related symptoms, the knowledge base of, perceptions of, and attitudes regarding PCPs, specifically NPs, regarding IBS and appropriate care for patients with IBS. Electronic databases searched included the Cumulative Index Nursing Allied Health Literature (CINAHL), EMBASE, Ovid, and PubMed. Manual search of reference lists in articles reviewed were searched. Primary searches also included Google Scholar. Inclusion criteria included: a) English language; b) publication years 2000-2016; c) research studies examining the knowledge level of, perceptions of, and attitudes of primary care givers toward IBS; (d) research studies examining the knowledge level of, perceptions of, and attitudes towards primary care givers regarding providing care. Exclusion criteria included: a) pediatric IBS; b) expert opinion articles; and c) case studies.

Search terms included: Irritable Bowel Syndrome (IBS), Rome criteria, dietary interventions, dietary therapy, FODMAP diet, clinical outcomes, incidence and prevalence, functional GI disorders, quality of life, as well as, knowledge, perception, and attitudes of primary care givers regarding patients with IBS. The FODMAP diet name refers to reduced content of fermentable short-chained carbohydrates (fermentable oligo-, di-, monosaccharides, and polyols.

Search terms were combined as follows: Irritable bowel syndrome (IBS) AND knowledge of primary care givers; Irritable bowel syndrome (IBS) AND attitudes of primary care givers; Irritable bowel syndrome (IBS) AND perceptions of primary care givers; IBS AND
quality of life; treatments AND Irritable bowel syndrome (IBS); dietary interventions AND Irritable bowel syndrome (IBS); FODMAP AND Irritable bowel syndrome (IBS); FODMAP AND functional gastrointestinal disorders; functional gastrointestinal disorders OR Irritable bowel syndrome (IBS) AND clinical outcomes; incidence AND prevalence AND Irritable bowel syndrome (IBS). Additionally, IBS and Irritable Bowel Syndrome were used interchangeably.

The EMBASE search yielded six randomized controlled trials. PubMed yielded one randomized controlled trial and four systematic review and meta-analysis articles. The CINAHL search produced two systematic reviews and meta-analysis articles, as well as, one retrospective questionnaire analysis. Eight descriptive cross-sectional studies and one descriptive systematic review were obtained via Google Scholar. Manual search of reference lists of reviewed Google Scholar publications yielded six additional descriptive studies. Duplicate studies were omitted.

**Critique and Synthesis of Previous Evidence**

The electronic search yielded 31 eligible studies for review: a) seven randomized controlled clinical trials as primary sources of evidence; b) nine systematic reviews and meta-analysis as secondary sources; c) one retrospective questionnaire analysis; and d) fourteen descriptive studies. One of the nine systematic reviews, was a systematic review of descriptive studies. All literature reviewed was specific to the research question. The Melnyk Level of Evidence (Melnyk, 2011) was utilized to grade each study (Appendix A). The Melnyk Levels of Evidence range from Level 1 (Systematic review & meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analyses) to Level 7 (Expert opinion). Melnyk’s system provides quick assessment of the strength of recommendation (Melnyk, 2011). The one systematic review was rated Level 5 and the descriptive studies were
all rated Level 6.

The comprehensive literature review highlighted several commonalities among the studies including diagnostic guidelines for IBS, limitations in provider knowledge, perception of disease severity, efficacy of pharmacologic therapies including probiotics, comparison of FODMAP diet versus placebo diets, and efficacy of FODMAP diet. Diagnosis of IBS was determined via the Rome criteria in all of the studies. The Rome criteria are systematic processes used globally to diagnose and treat functional GI disorders such as IBS. The diagnosis guidelines for IBS require abdominal pain or discomfort at least three days per month with associated altered bowel pattern and consistency of stool. Additionally, these symptoms require at least a six-month duration to meet the diagnostic standard (Rome Foundation, 2006). Updates to the Rome criteria were released in May 2016 with important changes including reports of pain only and abdominal pain at least one day per week over the previous three months. Reports of altered bowel patterns, consistency, and duration of six-month period requirements remained the same (IBSIMPACT, 2016). The recent release of the updated Rome criteria does not limit the quality or consistency of the reviewed studies as the new standard is less stringent.

Uniformity in the diagnosis of IBS promoted validity and reliability of the study results. Three of the studies (Eswaran et al., 2016; Rao et al., 2015; Shivaji et al., 2015) utilized additional criterion in addition to Rome criteria, which included National Institute for Health and Care Excellence: Clinical Guidelines (NICE, 2008). These guidelines provide recommendations and appropriate treatment for certain diseases (NIH, 2003). The use of additional guidelines increases the probability that the inclusion criteria of enrolled patients met the IBS diagnosis. The use of the Rome and NICE guidelines left little doubt that inclusion populations were diagnosed solely from clinician opinion. This aspect is important because IBS may be utilized as
a catchall for GI symptoms without correct diagnosis. Assurance that correct diagnosis was made prior to inclusion and enrollment into these studies increases the strength of evidence derived from the study appraisal, with resultant increase in validity. The knowledge gap regarding diagnostic criteria among primary care providers was evident. Twelve of the descriptive studies (Al-Hazmi, 2011; Adresen et al., 2014; Brennan et al., 2010; Charapata et al., 2006; Dickman et al., 2011; Dixon-Woods et al., 2000; Engsbro et al., 2013; Franke et al., 2009; Gikas et al., 2014; Longstreth et al., 2003; Olafsdottir et al., 2012; & Shivaji et al., 2015) highlight specific knowledge deficits with regard to utilizing the Rome criteria for diagnosis; diagnosis was made by exclusion. These studies’ sites were geographically diverse and included the US, Europe, United Kingdom, Saudi Arabia, and Taiwan. This diagnostic barrier in practice demonstrates one of the current issues IBS patients encounter. Additionally, this diagnosis by exclusion approach increases out of pocket cost, exposes patients to invasive procedures, and lengthens time to correct diagnosis. The remaining two descriptive studies (Chen et al., 2001, & Heitkemper et al., 2001) investigated nurses’ knowledge, perception, and attitudes regarding caring for the patient with IBS. These studies again identified that the knowledge deficit extends to nurses as well. Only one descriptive study (Brennan et al., 2010) included NPs in the sample, however knowledge scores were calculated with general practice physicians. Therefore, there was a paucity of studies examining knowledge, attitudes, and perceptions related to care of the patient with IBS.

Another barrier to care is the dichotomy regarding the perceptions of disease severity among providers and patients. Eight (Dickman et al., 2011; Dixon-Woods et al., 2000; Franke et al., 2009; Heitkemper et al., 2001; Longstreth et al., 2003; Olafsdottir et al., 2012; Shivaji et al., 2015; & Gikas et al., 2014) of the descriptive studies specifically addressed this issue and
identified provider misperception regarding etiology of IBS and related QoL. The lack of physical findings in the presence of clinical signs and symptoms promotes the perception of IBS as having a psychological basis. This viewpoint could be exaggerated by the knowledge deficit regarding IBS, and categorizes patients as being high maintenance, noncompliant, and time consuming. The aforementioned studies emphasize physicians and nurses’ perceptual deficit in quantifying IBS patients’ HRQoL. Patients consistently rated their HRQoL significantly lower than that of the PCP rating. Moreover, the literature recognizes that HRQoL is lower in IBS patients than in patients with other chronic illnesses (Monnikes, 2011). This last example of perceptual differences is the most meaningful because it significantly inhibits the provider/patient relationship, and thus, may diminish patient satisfaction and symptom management.

Treatment approach is an additional barrier to patient care, particularly when investigating the efficacy of pharmacologic therapies and probiotics. Four of the descriptive studies (Franke et al., 2009; Gikas et al., 2014; Shivaji et al., 2015; & Heitkemper et al., 2001) specifically referenced the use of pharmacologic agents as standard therapy for IBS. These include antispasmodics, laxatives, bulking agents, and antibiotics. Additionally, occasional use of tricyclic antidepressants and selective serotonin reuptake inhibitors were reported. These pharmacologic agents were used frequently despite the fact that these medications are largely ineffective in complete symptom management (Gikas et al., 2014). Although IBS guidelines have highlighted the lack of evidence for current drug management, they still recommend their use (Gikas et al., 2014). Inconsistencies in recommending non-pharmacologic therapies, such as diet, further limit patient outcomes.
Investigation regarding the efficacy and benefit of probiotics in IBS was presented in two systematic reviews (Ford et al., 2014; & Sanders et al., 2017). While certain probiotic interventions showed possible promise in IBS treatment no causal links in clinical improvement to probiotic-induced microbiota changes were noted (Sanders et al., 2017). Which specific probiotic species and strains are the most beneficial remains unclear (Ford et al., 2014). Therefore, further research is needed to assess the true benefits of the use of probiotics in IBS treatment. The limited findings noted in the systematic reviews concerning the use of probiotics further contributes to limitations in patient care.

Numerous studies investigated the use of diet medical nutrition therapy for IBS symptom management. The FODMAP was reported to be effective in the treatment of patients with IBS (Bohn et al., 2015). The use of the FODMAP diet versus a placebo or alternative diet in all the randomized controlled trials highlighted the benefit of this dietary intervention. Several of the studies compared the FODMAP diet to the NICE guidelines (Bohn et al., 2015, Eswaran et al.; 2016, Eswaran et al., 2016; & Merchant et al., 2016), while others compared FODMAP to a gluten free diet (Ford et al., 2014 & Piacentino et al., 2014). These studies together with the placebo diet studies support the positive value of the FODMAP diet because it surpasses several diet interventions in the amelioration of abdominal pain, bloating, and diarrhea. Moreover, in one randomized controlled trial (Eswaran et al., 2016) the FODMAP diet was shown to improve QoL, activity impairment, and sleep quality compared to NICE diet guidelines. Although the study used a single site, the crossover benefit sustained from the FODMAP diet showed potential broad-scale management of IBS patients and provides a holistic approach, which is the ultimate goal of healthcare. Further investigation would be warranted to explore the validity of this dietary intervention to improve symptom management, diet adherence, and HRQoL.
The overall success of symptom management seen throughout the literature review highlighted the efficacy of the FODMAP diet in the treatment and management of IBS. The appraisal studies, performed in multiple countries throughout Europe, the US, South and Central America have provided global results. This geographic diversity increases the validity and reliability of the results. Conducting studies globally regarding IBS allows us to learn about cultural and ethnic responses to the FODMAP diet. One randomized controlled trial that took place in Mexico compared the FODMAP diet with the regional cuisine and showed results of efficacious symptom management, including for depression (Galvez-Rios et al., 2016).

Additionally, multi-tiered service locations were utilized throughout the individual studies. These service levels highlight the ease of integration of the FODMAP diet at any point along the care continuum allowing introduction, adherence, and follow up to be addressed at each service point.

Limitations in the study designs included: a) small sample size; b) variability in the use of assessment tools; c) lack of specific NP-focused research; and d) non-validated survey questionnaires for four descriptive studies. Also, studies did not include the use of food diaries and had inadequate review of diet adherence.

All randomized controlled trials (Bohn et al., 2015; Eswaran et al., 2016; Eswaran et al., 2016; Galvez-Rios et al., 2016; Merchant et al., 2016; Piacentino et al., 2014; & Staudacher et al., 2016) had a sample sizes less than 100. The small size and use of single sites precluded generalizability of the findings. The systematic reviews (Ford et al., 2014; Ford et al., 2009; Marsh et al., 2016; Moayyedi et al., 2015; & Rao et al., 2015) had sample sizes of N=250 per study. The descriptive studies’ sample sizes ranged from 35 to 308 participants.

In addition to sample size, there was diversity seen in assessment tools. Several studies used the IBS Symptom Severity Scale (IBS SSS) (Bohn et al., 2015; Eswaran et al., 2016; Marsh
et al., 2016; & Staudacher et al., 2016). The IBS SSS is a five-question assessment tool that measures pain, days affected, abdominal distension, bowel habits, and interferences of life. IBS-related symptoms are rated on a visual analogue scale (0=no symptom to 10=very severe). Clinical utility has been demonstrated for this tool (Hawker et al., 2011). Additional tools utilized included the IBS Quality of Life scale (IBS QOL) (Eswaran et al., 2016 & Marsh et al., 2016), The Bristol Stool Scale, Daily Abdominal Pain Score Likert Scale, Hospital Anxiety and Depression Scale (Bohn et al., 2015). There are several IBS HRQoL scales used with patients with IBS. These referenced articles did not specify which IBS QOL assessment was utilized, and for this reason, an example was not included in the Appendices. The assessment tools were used intermittently in the remaining articles (Bohn et al., 2013; Eswaran et al., 2016; Ford et al., 2014; Ford et al., 2009; Galvez-Rios et al., 2016; Maagaard et al., 2016; Merchant et al., 2016; Moayyedi et al., 2015; Piacentino et al., 2014; & Rao et al., 2015), thus, the symptom assessment was limited.

No studies were found specifically examining NP’s knowledge base regarding IBS, or perceptions and attitudes regarding caring for the patient with IBS. Two descriptive studies (Brennan et al., 2010 & Heitkemper et al., 2001) included NPs in the sample. However, there was no reported data regarding the NP’s use of the Rome criteria in diagnosing IBS, their perception regarding the GI disorder, and attitudes towards IBS patients. In both studies, NPs were included in larger populations that may have obscured their practice capabilities. Their additional education and training level should theoretically increase their knowledge of Rome criteria, IBS as a GI disorder, and knowledge of treatment options as compared to a registered nurse (RN). Additionally, the nurse cohort in Heitkemper et al. (2001) only delineates “nurse” as an RN. It does not specify whether the RN education level is an Associate Degree or a
Bachelor’s Degree. This further confounds the findings when comparing the NP to an RN of variable education level. The study by Brennan et al. (2010) includes the NP with primary care physicians and only denotes that PCPs were less likely to diagnose IBS using Rome criteria as compared to the gastroenterologist. Therefore, no comparison to other provider colleagues could be ascertained.

Validation of the study results posed concerns in three of the descriptive studies (Charapata et al., 2006; Franke et al., 2009; & Shivaji et al., 2015). These studies did not report face validity. Additionally, these specific studies were conducted in a single site with small sample sizes further limiting the reliability and reproducibility of the results. The other studies either reported face validity (Al-Hazmi, 2012; Longstreth et al., 2003), utilized modifications of established assessment tools (Chen et al., 2001; Dickman et al., 2011; Engbro et al., 2013; Heitkemper et al., 2001; & Olafsdottir et al.; 2012) or clinical vignettes (Andresen et al., 2015; Brennan et al. 2010). Survey-based clinical vignettes have been validated as an accurate proxy for both chart abstraction and standardized patients, and thus, are widely recognized to be a valid, reliable, practical, and cost-effective technique to access process of care (Andresen et al., 2015).

Further variability across the body of evidence highlights the lack of food diary use. Only one randomized controlled trial noted the use of a food diary (Bohn et al., 2015) for the purpose of examining average daily intakes of high FODMAP containing foods during the initial intake and the final week of the study. Food diaries could provide insight into not only intake of high FODMAP containing foods but also nutritional deficiencies stemming from patient self-imposed elimination diets. Considering 89.6% of IBS patients identify worsened symptoms with certain
foods as compared to 55% of healthy patients (Hayes, 2013) it is important to identify nutritional imbalances such as vitamin B or iron deficiencies as this could lead to severe malnourishment.

Concerns regarding adherence were noted in several of the studies (Bohn et al., 2015; Galvez-Rios et al., 2016; & Marsh et al., 2016). Regarding adherence, it would be beneficial to have patients log their food intake over a period of time to ascertain symptom presence following high FODMAP exposure. One study (Merchant et al., 2016) examined DNA markers for receptivity to a low FODMAP diet, and noted that considering the complexity of the FODMAP diet, it would advance clinical practice if biomarkers could identify patients with a high probability of diet response (Merchant et al., 2016). This specific study recommends neither the use of a food diary for adherence nor identification of biomarkers for diet responders. However, a food diary could assist in identifying food triggers and the need for the FODMAP diet. The complexity of the diet could represent a possible reason why it is not readily included as a treatment option in the primary care setting. The often-limited access to Registered Dieticians in the primary care setting could increase negative attitudes or perceptions of diet interventions as a viable treatment option. The literature review does not address specific reasons why medical nutrition therapy is often overlooked. A possible factor may stem from the lack of formal nutritional education leading to poor confidence on the part of the provider in adequately addressing IBS patients’ dietary needs.

Utilization of the FODMAP diet, whether used through strict food elimination or food limitation, poses concerns for long-term use and benefit, and was an additional variability noted during the appraisal. Within the appraised studies there were differences to the length of time the dietary intervention was utilized. Several of the randomized controlled trials (Bohn et al., 2015; Eswaran et al., 2016; Eswaran et al., 2016; Merchant et al., 2016; Piacentino et al., 2016; &
Staudacher et al., 2016) investigated the efficacy of the diet over a four-week period. There was one randomized controlled trial (Galvez-Rios et al., 2016) that recommended a shortened period of dietary intervention that spanned only one-week. Most of the studies reviewed noted that within the first week symptom benefit was shown. However, use of diverse assessment tools may have affected the findings regarding response and necessary duration of intervention. Although the systematic reviews had variable lengths of time of FODMAP intervention within their literature review, none of the studies had duration of more than one-month. Authors did note that additional research was needed to promote validity of the results. Moreover, there was limited discussion regarding reintroduction of high FODMAP foods and the potential symptom exacerbation leading to concern regarding necessary long-term use, lasting effects on the microbiota (Staudacher et al., 2016), and potential symptom exacerbations with reintroduction of high FODMAP foods. The lack of uniformity of diet length, reintroduction of FODMAP foods, and microbiota changes could produce or increase bias by PCPs if they are familiar with the diet.

The literature review highlighted correlations in knowledge deficit, symptom reduction/management, and HRQoL for IBS patients. Diagnosis by exclusion was seen to increase both patient risk and cost. No studies were found that examined knowledge, attitudes, and perceptions of IBS or its treatments in the NP population. Medical nutrition therapy, although shown to be effective in symptom management throughout the reviewed studies, was not consistently prescribed in primary care settings. It is unknown why diet interventions are not readily utilized in this setting. The lack of uniformity in the length of FODMAP use could be a reason this treatment option is not a standard IBS therapy. Although food diaries to identity food trigger for IBS were not standard components within the studies, it was noted (Eswaran et al., 2016; Marsh et al., 2016; Piacentino et al., 2014) that a food journal could increase adherence to
the FODMAP regimen. Expansion of this finding was presented by Marsh et al., wherein the use of the Monash University low FODMAP diet smartphone app could provide assessable visual guidance on low FODMAP substitutes for food assisting with the ease in which the diet can be followed (2016). Review of these questions could provide more rigor to these findings.

Sample size was a limitation. Most studies had less than 150 participants. A more robust sample size could increase the validity of the findings. Additionally, study sites were primarily international. Although the global aspect was noted as strength, further research is needed in the US. These limitations provide rationale for investigation into NP practice with IBS patients and the possible benefits of a low FODMAP diet in patients with IBS.

**Rationale for the Project**

The literature review yielded study results showing PCP’s knowledge deficits of the Rome criteria, PCP underestimation of patient disease severity, and viable treatment therapies. Although the literature addressed these knowledge deficits in MDs, there was no literature found regarding knowledge level, perception, and attitudes of NPs who provide primary care to IBS patients. Thus, it is imperative to examine NPs’ knowledge levels, perception, and attitudes regarding IBS. This data could identify specific knowledge barriers and allow for testing targeted educational interventions to promote NPs following established evidence-based clinical practice guidelines for clinical management of patients with IBS. Appropriate IBS care provided by the primary care NP is a professional obligation. The ultimate goal is to improve patient outcomes with the most cost effective and least intrusive treatment strategies.
Chapter III

Methods

Design

The DNP scholarly project used a descriptive, mixed-methods, cross-sectional, survey design. Inclusion criteria for the sample were: a) ≥ 18 years of age; b) NPs who provide care to patients with IBS in the primary care or acute care setting; c) NPs who are licensed and board certified; d) NPs who are active members of the FLANP; e) NPs who have computer access to use SurveyMonkey™; and f) NPs with an active email address. Exclusion criteria were: a) primary care physicians; b) gastroenterologists; and c) GI NPs. These providers were excluded due to: a) physician focus; and b) gastroenterology providers use Rome criteria and diets routinely. Participants were given two weeks to complete the survey online. The FLANP staff sent out a reminder e-mail at one week following the initial survey mailing encouraging completion of the survey. Completion and submission of the survey denoted participant informed consent.

Aims

Specific aims for this scholarly project were: a) to examine the knowledge level of primary care NPs’ regarding IBS pathophysiology, appropriate IBS diagnosis, and evidenced based treatment for IBS and related symptoms; b) to examine primary care NPs’ perception of caring for adult patients with IBS; c) to examine primary care NPs’ attitudes towards caring for adult patients with IBS; and d) to examine correlations between primary care NP’s knowledge level, perceptions, and attitudes and socio-demographics variables of research interest including age, gender, years in practice as a primary NP, and nursing education level.
Setting

The setting for this project was an electronic survey administered through SurveyMonkey™

Sampling Plan

The sample was recruited through the FLANP, which is affiliated with the American Association of Nurse Practitioners. Membership for the FLANP may fluctuate slightly due to new membership registration and any current member up for renewal who does not pay their membership renewal fee. Thus, the number of active members was calculated at the time the survey was dispersed. The survey was distributed to all study eligible members of the FLANP.

Survey Instrument

The 39-item investigator created survey tool consisted of 4 distinct sections: a) sociodemographic section; b) knowledge level section assessing IBS pathophysiology, appropriate IBS diagnosis, and evidenced based treatment for IBS and related symptoms; c) attitudes section assessing participant’s attitudes toward caring for IBS patients; and d) perception section assessing the participant’s perceptions of caring for patients with IBS.

Survey tool response items were identified from the literature and the DNP scholar’s three years of clinical experience working with this population. All response items related directly to the project’s purpose and aims. A panel of experts validated the survey tool regarding content validity and administration utility. This expert group consisted of the DNP Team Lead, from the Department of Professional Nursing Practice, School of Nursing & Health Studies, Georgetown University, two medical GI experts, and the study statistician. The survey was created using the DNP scholar’s personal SurveyMonkey™ Gold Plan.
Sociodemographic data included age, gender, ethnicity, race, years in nursing practice, highest nursing education level (MS/MSN, DNP, and PhD), and nursing practice specialty (FNP, Acute Care, and Adult). The demographic data was used to examine correlations between primary care NP’s knowledge level, perceptions, and attitudes regarding IBS and age, gender, years in practice as a primary NP, and nursing education level. Additional investigation regarding years of practice and specialty was performed to determine if a specific target population of NPs would benefit from additional IBS education and treatment information. Correlations between nursing education level and knowledge, attitudes, and perceptions were investigated to determine the effect of nursing education level on participants and these variables.

**Knowledge Section**

Knowledge questions captured the participant’s knowledge level regarding IBS pathophysiology, appropriate IBS diagnosis, and evidence-based treatment for IBS and related symptoms. Participants rated themselves on a Likert-Type scale with possible scores rated as: 1= No knowledge; 2 = Some knowledge; 3 = Moderate knowledge; 4 = Good knowledge; 5 = Very good knowledge; and 6 = Excellent knowledge. The total score was the sum of all the questions with the lowest score being “1” and the highest being “6”. There were two multiple choice questions assessing participants knowledge of diets and pharmacologic therapies included in the knowledge section.

**Attitudes Section**

The attitude questions captured participant’s confidence in diagnostic acumen, patient satisfaction, treatment time requirement, provider satisfaction, and practice strategy. These questions required participants to rate themselves on a Likert-Type scale with possible scores
ranging from 1 = Very strongly disagree; 2 = Strongly disagree; 3 = Disagree; 
4 = Agree; 5 = Strongly Agree; and 6 = Very strongly agree. The total score was the sum of all 
the questions with the lowest score being “1” and the highest being “6”. One multiple choice 
question regarding use of diagnostic tests was included within this section.

**Perceptions Section**

Perception questions assessed participants’ opinion on whether IBS is a chronic disease, 
IBS related symptoms are severe, IBS limits health-related quality of life, IBS patients miss more 
work or school, IBS patients understand their diagnosis, IBS patients understand their care plan, 
and if patients play an important role in their symptom management. Participants rated 
themselves on a Likert-Type scale with possible scores including: 1 = Very strongly disagree; 2 
= Strongly disagree; 3 = Disagree; 4 = Agree; 5 = Strongly Agree; and 6 = Very strongly agree. 
The total score was the sum of all the scores from all the questions with the lowest score being 
“1” and the highest equaling “6”.

Two open-ended questions were presented following the perception Likert-Type scaled 
questions. These questions assessed whether participants felt they would benefit from additional 
education regarding IBS and patient management, and what educational modality would be the 
most useful for them to receive information about IBS and IBS management. Respondents were 
asked to explain their answers.

**Procedures**

The Institutional Review Board (IRB) application was completed and submitted by the 
DNP scholar for approval to the Georgetown University (GU) IRB, Section C, Social Behavioral 
Committee. The IRB not only ensures ethical standards, but also ensures responsible science in 
all research studies involving human subjects. The rigor and quality of research must be
sufficient to protect and limit potential harm to subjects within the study. For these reasons the ethical principles of respect for persons, protection of vulnerable populations, beneficence, and justice must serve as the basis for any research study.

The DNP scholar, in consultation with the DNP Team Lead, addressed IRB-related stipulations. The DNP project received IRB expedited review because there was minimal risk to human subjects, described as discomfort or risk that is not greater than encountered in daily life (Moran et al., 2014). The study received GU IRB approval before data collection began.

The DNP scholar established a partnership with the FLANP to allow their distribution of the survey to its members. Permission for survey distribution was obtained by the DNP scholar from the FLANP Board of Directors. Following GU IRB approval, the DNP scholar contacted the FLANP organization, and sent the point of contact the study invitational letter within which was embedded the link to the SurveyMonkey™ for distribution. This point of contact person distributed the SurveyMonkey™ to all eligible FLANP members via their registered e-mail. Eligible participants clicked on the survey link contained within the introductory letter to participate in the study and to indicate that they were eligible for the study: ≥ 18 years of age primary care NPs currently practicing with IBS patients in the state of Florida. The introductory letter included study rationale, eligibility criteria, study procedures, time to complete the survey (approximately 15 minutes), potential risks and benefits, explanation that participants may withdrawal from the study at any time, how the participants’ confidentiality would be protected and how data would be maintained confidentially, the DNP scholar’s contact information, and to whom to ask questions about the study.

Confidentiality has been maintained via several mechanisms. These included Secure Sockets Layer (SSL) encryption and disabled IP address tracking. These safety mechanisms were
established via the SurveyMonkey™ platform. Additionally, no response identifiers occurred in the data analysis. All data were in aggregate form. The privacy policy of SurveyMonkey™ was attached to the consent form for participant review.

**Data Analysis Plan**

The data analysis plan was created in collaboration with the study statistician. The data analysis focused on answering the project’s aims. Descriptive statistic techniques such as frequency, distribution, measurements of central tendency, percentages, and measures of variability were used to characterize the sample. Three domains of the survey (knowledge, attitudes, and perceptions) were analyzed for coefficient of reliability. The use of one-way ANOVAs demonstrated whether any statistical differences existed between the means of NPs’ knowledge, attitudes, and perceptions and their nursing education level, years of experience, and age. Independent samples t test was utilized to determine any statistical differences between knowledge and nursing education level, attitudes and nursing education level, and perceptions and nursing education level. Data analysis was conducted using Microsoft Excel© and the IBM SPSS (ver. 24, 2016) statistics software. Content data analysis was performed to analyze thematic content of the open-ended questions’ responses.

**Data Management**

This project used an anonymous survey, and confidentiality of the participants was maintained using a unique participant identification number. Data were directly downloaded to and stored on the DNP scholar’s password-protected computer. Only the DNP scholar, her faculty DNP Team Lead, and the study statistician had access to the data.

All data was in electronic format with safety measures such as SSL encryption, disabled IP tracking, and aggregate data analysis. No printed responses or personal identifiers were
produced. Retention of data secured with the SurveyMonkey™ organization spans as long as the paid service is enabled or is applicable by law. The DNP scholar’s SurveyMonkey™ Gold member account ends in May 2018; therefore, the data will not be stored with SurveyMonkey™ beyond this date.

**Ethical Considerations**

The study was approved by the Georgetown University based IRB. The DNP scholar completed the Collaborative Institutional Training Initiative (CITI) classes in both Biomedical and Social and Behavioral Responsible Conduct of Research, and informed consent, which present study rational, risks versus benefits, data confidentiality protection, and inclusion and exclusion criteria.

**Budget Analysis**

Budget obligations for the DNP project included: a) Licensure cost and application for new RN/ARNP in the state of Florida was $210.00 (Florida Board of Nursing, 2016); b) registered and paid membership dues to the FLANP; c) paid to obtain a SurveyMonkey™ Gold member account; d) statistician cost; and e) transportation and lodging cost to the FLANP annual conference in Spring of 2018. Membership to the FLANP typically cost $100.00 per year, however the DNP scholar, as a student, qualified for the discounted student rate, which is $50.00 per year (FLANP, 2016).

SurveyMonkey™ Gold membership is $300.00 per year (surveymonkey.com, 2016). The Gold membership allows unlimited questions and responses, and provides data exports and reports, statistical significance and text analysis, question and answer piping, question and page randomization, and email support. The DNP scholar received statistical support from a Georgetown University faculty statistician, who provided these services at a student rate of
$25.00/hour. Total statistician cost was estimated at $148.00 for 5.9 hours of statistical assistance. The project utilized descriptive statistics, which were calculated with Microsoft Excel© and IBM SPSS (version 24, 2016).

Partnership with the FLANP for a research project requires presenting the DNP project findings at the FLANP annual conference in the spring of 2018. Information gathering regarding transportation costs is dependent on the locale, which has yet to be determined. Therefore, travel cost (airfare, lodging, and food) has been estimated to be $1500.00. Conference participation is free for presenters, and thus, no additional fees will be required for conference attendance. The DNP project findings will be presented via lecture and accompanying PowerPoint. No printed materials will be required.

Total cost estimation is $2,208.00. No other cost such as project tools, printed materials, setting, or utilities were anticipated for the DNP project. The DNP scholar provided primary funding for the DNP project, which included Florida RN licensure, FLANP membership, SurveyMonkey™ Gold membership, and travel expenses.
Chapter IV

Results

Results from the data analysis are now presented. These results are derived using descriptive statistic techniques such as frequency, distribution, measurements of central tendency, percentages, and measures of variability to characterize the sample. The descriptive, cross sectional, survey design provided assessment of current healthcare practices of NPs who care for the IBS patient population. Three domains of the survey (knowledge, attitudes, and perceptions) were analyzed for coefficient of reliability. These Chronbach’s alpha scores highlighted the consistency of each survey section. Additionally, the use of one-way ANOVAs demonstrated whether any statistical differences existed between the means of NPs’ knowledge, attitudes, and perceptions and their nursing education level, years of experience, and age. Independent samples t test was utilized to determine any statistical differences between knowledge and nursing education level, attitudes and nursing education level, and perceptions and nursing education level. Results interpreted from the data analysis show if the study aims were met, what the significance of the findings are, and how the information can shape future recommendations.

Primary Aims

This DNP scholarly project had four specific study aims. These include identification of the following: a) any primary care NP knowledge deficits with regard to pathophysiology, appropriate diagnosis, and evidence based treatment options for IBS; b) any attitude barriers of the primary care NP caring for IBS patients; c) any perceptional barriers of the primary care NP
caring for IBS patients; and d) identification of any correlation between NP knowledge, attitude, or perception barriers and sociodemographic variables of research interest.

**Characteristics of the Sample**

The sample \( (N = 64) \) was predominantly female (93.8%), middle-aged (> 55 years), Caucasian (89.1%), Non-Hispanic or Latino (87.5%), and had \( \leq 5 \) years of experience as NPs. The education level of the sample was primarily MS/MSN (75.0%). Additionally, specialty practice was primarily family practice (53.1%) (Table 1).

<table>
<thead>
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<th>Table 1. Characteristics of the Sample. ( (N = 64) )</th>
<th>( N )</th>
<th>%</th>
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<tr>
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Knowledge Section

There were 58 respondents to all 8 Knowledge Section scale items. Thus, the means and standard deviations are based on the participants who completed all knowledge questions. A six-point Likert-Type scale, ranging from 1 = No knowledge to 6 = Excellent knowledge, provided the scoring range for each of the eight items within this scale. The independent means and standard deviations for each of the eight items within the Knowledge Section are seen in Table 2.
### Table 2. Means and Standard Deviations for Items in Knowledge Scale. (N=58)

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How would you rank your general knowledge of irritable bowel syndrome (IBS)?</td>
<td>3.14</td>
<td>.923</td>
</tr>
<tr>
<td>2. How would you rank your general knowledge of Functional Gastrointestinal Disorders (FGID)?</td>
<td>2.55</td>
<td>.989</td>
</tr>
<tr>
<td>3. How would you rank your knowledge of pathophysiology of irritable bowel syndrome (IBS)?</td>
<td>2.86</td>
<td>1.069</td>
</tr>
<tr>
<td>4. What experience level do you have caring for patients with irritable bowel syndrome (IBS)?</td>
<td>2.63</td>
<td>1.273</td>
</tr>
<tr>
<td>5. What is your knowledge level of the use of the ROME III or IV diagnostic criteria to diagnose irritable bowel syndrome (IBS)?</td>
<td>1.77</td>
<td>1.079</td>
</tr>
<tr>
<td>6. What is your knowledge level of evidence based practice recommendations supporting the ROME III or IV diagnostic criteria?</td>
<td>1.71</td>
<td>1.057</td>
</tr>
<tr>
<td>7. What is your general knowledge level regarding the use of nutrition to manage irritable bowel syndrome (IBS)?</td>
<td>2.61</td>
<td>1.201</td>
</tr>
<tr>
<td>8. What is your knowledge level regarding the use of medical nutrition therapy (MNT) to manage irritable bowel syndrome (IBS) related symptoms?</td>
<td>2.23</td>
<td>1.144</td>
</tr>
</tbody>
</table>

(Key: SD=standard deviation)

On a six-point Likert-Type scale, the mean score for the overall Knowledge Section was 2.44 (SD = 0.869), indicating low knowledge of pathophysiology, appropriate diagnosis, and evidence based treatment options for IBS. The significantly skewed knowledge score is noted in Figure 1.
A coefficient of reliability was calculated for the eight-item survey Knowledge Section scaled questions. The scale was noted to have high reliability as demonstrated by the Cronbach’s alpha = .923.

Included within the survey Knowledge Section were two questions assessing NP use of diet and pharmacologic therapies to manage IBS symptoms. The following discussion will focus on findings derived from these questions. The “use of diet” question provided seven dietary therapies or medical nutrition therapies commonly utilized to manage IBS symptoms. Respondents were allowed to choose all diets that applied. The 59 respondents demonstrated that the use of these diets was fairly low. This can be seen in Table 3.
**Table 3. Use of Diets to Manage Irritable Bowel Syndrome. (N = 59)**

<table>
<thead>
<tr>
<th>Diet</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FODMAP</td>
<td>14</td>
<td>23.7</td>
</tr>
<tr>
<td>NICE guidelines</td>
<td>6</td>
<td>10.2</td>
</tr>
<tr>
<td>Gluten free diet</td>
<td>23</td>
<td>39.0</td>
</tr>
<tr>
<td>High fiber diet</td>
<td>28</td>
<td>47.5</td>
</tr>
<tr>
<td>Low fiber diet</td>
<td>7</td>
<td>11.9</td>
</tr>
<tr>
<td>Elimination diet</td>
<td>33</td>
<td>55.9</td>
</tr>
<tr>
<td>Low fat diet</td>
<td>10</td>
<td>16.9</td>
</tr>
</tbody>
</table>

1. FODMAP = fermentable short chained carbohydrates (fermentable oligo-, di-, monosaccharides, and polyols)

Only an elimination diet was chosen by more than 50% of respondents. Following the “use of diet” question, the survey presented a follow-up question inquiring about the NP’s knowledge of the FODMAP diet. Of the 59 respondents who answered the question regarding their knowledge of the FODMAP diet, 36 (62.1%) said they had “no knowledge” and 17 (29.3%) had “some knowledge”. One participant (1.7%) reported moderate knowledge and two (3.4%) reported very good knowledge. Current literature supports the use of the FODMAP diet to manage IBS symptoms, and thus the reported limited familiarity and use identified by this sample highlighted knowledge deficits with regard to dietary management options.

The coefficient of reliability for the “use of diet” question did not work as a scale (Cronbach’s alpha = .219), although you would not necessarily expect it to, as use of any one diet would probably be independent of use of any other diet.

All survey respondents (N=59) were asked to identify what if any pharmacologic therapies they utilize to manage IBS symptomology. The percentage of the sample who reported using specific pharmacologic therapies to treat IBS symptoms is noted in Table 4.
Table 4. Use of Drugs to Manage Irritable Bowel Syndrome Symptoms. (N = 59)

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antispasmodics</td>
<td>45</td>
<td>76.3</td>
</tr>
<tr>
<td>Laxatives</td>
<td>18</td>
<td>30.5</td>
</tr>
<tr>
<td>Bulking agents</td>
<td>29</td>
<td>49.2</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>8</td>
<td>13.6</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>11</td>
<td>17.2</td>
</tr>
<tr>
<td>SSRIs1</td>
<td>19</td>
<td>32.2</td>
</tr>
</tbody>
</table>

1. SSRI= selective serotonin reuptake inhibitor

Table 4 identifies antispasmodics (76.3%) as the most frequently used medication chosen by primary care NPs to manage IBS symptoms. Although some antispasmodics provide short-term benefit for IBS symptom management, higher incidences of adverse effects are more common with this drug class than placebo (Ford et al., 2014). Following the choice of prescribed antispasmodics by the survey respondents, bulking agents (49.2%) were the second most frequently prescribed pharmacologic agent. It is important to note that insoluble fibers (bulking agents) may exacerbate symptoms and provide little relief (Ford et al., 2014). Current literature denotes limitations in pharmacologic agents, particularly the two most commonly chosen by the survey participants. This occurrence further highlights knowledge deficits in primary care NP practice with regards to IBS treatment and management.

The coefficient of reliability for “pharmacologic therapies” did not work as a scale (Cronbach’s alpha = .563), although it would probably not be expected to, as use of one drug is probably independent of use of other drugs.

Attitudes Section

The Attitude Section of the survey presented a question regarding the use of diagnostic testing for the purpose of obtaining an IBS diagnosis. Table 5 highlights the percentage of respondents who said a particular diagnostic test should be used for IBS diagnosis. Colonoscopy
was endorsed as a diagnostic measure by a majority of the sample (63.8%), followed by laboratory studies (58.6%).

Table 5. Diagnostic Tests that Should be Used for Irritable Bowel Syndrome. (N = 58)

<table>
<thead>
<tr>
<th>Test</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory studies</td>
<td>34</td>
<td>58.6</td>
</tr>
<tr>
<td>Radiographic imaging</td>
<td>10</td>
<td>17.2</td>
</tr>
<tr>
<td>Esophagogastroduodenoscopy</td>
<td>17</td>
<td>29.3</td>
</tr>
<tr>
<td>Capsule endoscopy</td>
<td>8</td>
<td>13.8</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>37</td>
<td>63.8</td>
</tr>
<tr>
<td>None of above</td>
<td>8</td>
<td>13.8</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Utilization of colonoscopy and laboratory studies is not likely to be useful in providing an appropriate IBS diagnosis, especially considering the positive predictive value of the Rome III or IV criteria for IBS (Franke et al., 2009). Therefore, the aforementioned diagnostic tests are not likely to present a positive yield in the absence of warning signs (fever, GI bleeding, weight loss, anemia, and abdominal mass). The high percentage of use of colonoscopy and laboratory studies does place the patient at increased risk for complications and cost derived from these unnecessary procedures. Thus, the reported NP attitude toward diagnostic procedures may present some barriers towards IBS patient care and management.

As would be expected, the coefficient of reliability for “use of diagnostic tests” produced a low Chronbach’s alpha (α = .652). This is partly attributed to the possibility that use of one diagnostic test would probably be independent of use of another diagnostic test.

The Attitude Section included eight scale items. There were 49 respondents to all 8 attitude scale items. Thus, the means and standard deviations are based from participants that completed all the questions. A six-point Likert-Type scale, with 1 = Very strongly disagree and 6 = Very strongly agree provided the scoring range for the eight items within this scale. The
independent means and standard deviations for each of the eight items within the attitude scale are seen in Table 6.

Table 6. Means and Standard Deviations for Descriptives of Attitudes Scale.  (N=49)  

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe Irritable bowel syndrome (IBS) is a diagnosis of exclusion.</td>
<td>4.18</td>
<td>.834</td>
</tr>
<tr>
<td>I believe the ROME III or IV diagnostic criteria provide the ability to diagnose irritable bowel syndrome (IBS) at the initial clinic visit without additional testing.</td>
<td>3.63</td>
<td>.636</td>
</tr>
<tr>
<td>I believe patients with irritable bowel syndrome (IBS) clinical signs require extended clinic visit time to address their concerns.</td>
<td>4.37</td>
<td>.834</td>
</tr>
<tr>
<td>I believe patients with irritable bowel syndrome (IBS) related symptoms require extended clinic visit time to address their concerns.</td>
<td>4.37</td>
<td>.906</td>
</tr>
<tr>
<td>I believe patients with irritable bowel syndrome (IBS) related symptoms require more individual provider time than patients without irritable bowel syndrome (IBS).</td>
<td>4.12</td>
<td>.992</td>
</tr>
<tr>
<td>I believe it is easy for the nurse practitioner to create a care plan for patients with irritable bowel syndrome (IBS) symptoms.</td>
<td>3.65</td>
<td>.663</td>
</tr>
<tr>
<td>I believe it is easy for the nurse practitioner to assist irritable bowel syndrome (IBS) patients to adhere to their care plan.</td>
<td>3.98</td>
<td>.750</td>
</tr>
<tr>
<td>I believe that it is professionally satisfying to treat patients with irritable bowel syndrome (IBS) related symptoms?</td>
<td>4.16</td>
<td>.874</td>
</tr>
</tbody>
</table>

On a six-point Likert-Type scale, the mean score for the overall attitude scale section was 4.02 (SD = 0.59), indicating modest agreement with the items as a whole. As indicated by the modest agreement toward the attitude scale items, no specific barriers or deficits were noted on the part of the respondents. The scale is fairly normally distributed as can be seen in the histogram (Figure 2).
A total of 54 respondents answered, thus the sample size for the reliability analysis, which requires responses on all questions, and the results for the overall scale are different. The coefficient of reliability was therefore calculated with the Chronbach’s alpha .778.

Perceptions Section

The Perception Section survey included questions designed to discern how primary care NPs think regarding: a) IBS as a chronic disease; b) severity of symptoms; c) if IBS limits a patient’s health-related quality of life; d) if IBS patients miss more work or school than those patients without IBS; e) patients understanding of their diagnosis; f) patients understanding of their care plan; and g) the role patients play in their IBS related symptom management.

There were 51 respondents to all 9 perception scale items. Thus, the means and standard deviations are based from participants who completed all the questions. A six-point Likert-Type scale, with 1 = Very strongly disagree and 6 = Very strongly agree, one being the lowest and six
being the highest score, provided the scoring range for the nine items within this scale. The independent means and standard deviations for each of the nine items within the perception scale are seen in Table 7.

<table>
<thead>
<tr>
<th>Description</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think irritable bowel syndrome (IBS) is a chronic disease.</td>
<td>4.55</td>
<td>.832</td>
</tr>
<tr>
<td>I think irritable bowel syndrome (IBS) related symptoms may be severe.</td>
<td>5.00</td>
<td>.825</td>
</tr>
<tr>
<td>I think irritable bowel syndrome (IBS) may limit a patient’s health-related quality of life.</td>
<td>4.90</td>
<td>.831</td>
</tr>
<tr>
<td>I think irritable bowel syndrome (IBS) may SEVERELY limit a patient’s health-related quality of life.</td>
<td>4.59</td>
<td>1.043</td>
</tr>
<tr>
<td>I think patients with irritable bowel syndrome (IBS) miss more days of work than patients without irritable bowel syndrome (IBS).</td>
<td>4.49</td>
<td>.967</td>
</tr>
<tr>
<td>I think patients with irritable bowel syndrome (IBS) miss more days of school than patients without IBS.</td>
<td>4.47</td>
<td>.946</td>
</tr>
<tr>
<td>I think patients with irritable bowel syndrome (IBS) have a good understanding of their diagnosis.</td>
<td>3.10</td>
<td>.640</td>
</tr>
<tr>
<td>I think patients with irritable bowel syndrome (IBS) have a good understanding of their care plan.</td>
<td>3.39</td>
<td>.666</td>
</tr>
<tr>
<td>I think patients play an important role in their irritable bowel syndrome (IBS)-related symptom management.</td>
<td>5.16</td>
<td>.834</td>
</tr>
</tbody>
</table>

On a six-point Likert-Type scale, the mean score for the overall perception section was 4.41 (SD = 0.58), indicating an average level of agreement between agree and strongly agree to the nine perception scale items. As can be seen in Figure 3, the scale is fairly normally distributed.
A coefficient of reliability was calculated for the nine-item perception scale. The scale was noted to have good reliability as demonstrated by the Cronbach’s alpha = .862. The good reliability of the perception scale items, in conjunction with the mean score calculations of the nine individual perception scale items, denotes no obvious perceptual barriers on the part of the NP when caring for the IBS patient population.

**Differences by Education Level**

Investigation into whether any statistical differences existed between the means of NPs’ knowledge, attitudes, and perceptions and sociodemographic variables of research interest, specifically nursing education level, years of experience, and age, were completed using one-way ANOVAs. Comparison of the mean scores for the scales by education level are noted below in Table 8.
Table 8. Comparison of Mean Scale Scores by Education Level.

<table>
<thead>
<tr>
<th></th>
<th>MS/MSN M (SD)</th>
<th>DNP M (SD)</th>
<th>Other M (SD)</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>2.40 (0.86)</td>
<td>2.76 (0.83)</td>
<td>2.18 (1.04)</td>
<td>0.95</td>
<td>.393</td>
</tr>
<tr>
<td>Attitude</td>
<td>3.99 (0.57)</td>
<td>4.15 (0.61)</td>
<td>3.98 (0.83)</td>
<td>0.27</td>
<td>.762</td>
</tr>
<tr>
<td>Perception</td>
<td>4.37 (0.61)</td>
<td>4.40 (0.48)</td>
<td>4.78 (0.48)</td>
<td>1.10</td>
<td>.338</td>
</tr>
</tbody>
</table>

No significant differences were noted for knowledge by nursing education level \(F(2, 55) = 0.95, p > .05\], attitude by nursing education level \(F(2, 51) = 0.27, p > .05\], or perception by nursing education level \(F(2, 49) = 1.108, p > .05\] scores.

The difference between MS/MSN and DNP was examined using independent samples t test, as there were only 5 “Other” education levels that varied from student to doctoral level. No differences were noted for the knowledge scores between MS/MSN and DNP scores \(t(51) = 1.20, p = .235\], attitude scores between MS/MSN and DNP scores \(t(47) = 0.751, p = .457\], and perception scores between MS/MSN and DNP scores \(t(45) = 0.157, p = .876\].

Differences by Gender

The sample contained only two males, for which only one responded to both the attitude and perception scales. Therefore, statistical comparisons were impossible for both the attitude and perceptions scales due to the lack of variance. With the vastly unequal sample size between males and females, statistical comparison of the means for knowledge was also not advisable. Examination of the means suggests little difference by gender, however (see Table 9).

Table 9. Comparison of Mean Scale Scores by Gender.

<table>
<thead>
<tr>
<th></th>
<th>Male M (SD)</th>
<th>Female M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>2.56 (0.44)</td>
<td>2.46 (0.88)</td>
</tr>
<tr>
<td>Attitude</td>
<td>3.75 (na)</td>
<td>4.02 (0.60)</td>
</tr>
<tr>
<td>Perception</td>
<td>4.33 (na)</td>
<td>4.41 (0.59)</td>
</tr>
</tbody>
</table>
Differences by Years of Nurse Practitioner Experience

Years of NP experience had no bearing on knowledge, attitude, or perception, as noted by One-way ANOVA scores. Results of the comparison are presented in Table 10.

Table 10. Comparison of Mean Scale Scores by Years of Nurse Practitioner Experience.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Knowledge M (SD)</th>
<th>Attitude M (SD)</th>
<th>Perception M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>2.24 (0.42)</td>
<td>4.15 (0.62)</td>
<td>4.46 (0.60)</td>
</tr>
<tr>
<td>1-5 years</td>
<td>2.31 (0.80)</td>
<td>3.94 (0.49)</td>
<td>4.38 (0.75)</td>
</tr>
<tr>
<td>6-10 years</td>
<td>2.08 (0.64)</td>
<td>3.63 (0.66)</td>
<td>4.06 (0.34)</td>
</tr>
<tr>
<td>11-15 years</td>
<td>2.25 (0.88)</td>
<td>4.17 (0.84)</td>
<td>4.82 (0.41)</td>
</tr>
<tr>
<td>16-20 years</td>
<td>2.85 (1.44)</td>
<td>4.05 (0.26)</td>
<td>3.96 (0.44)</td>
</tr>
<tr>
<td>21-25 years</td>
<td>3.03 (0.97)</td>
<td>4.22 (0.43)</td>
<td>4.62 (0.53)</td>
</tr>
<tr>
<td>26-30 years</td>
<td>2.54 (0.58)</td>
<td>4.23 (0.45)</td>
<td>4.58 (0.16)</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>3.69 (0.09)</td>
<td>4.38 (0.88)</td>
<td>4.72 (0.39)</td>
</tr>
<tr>
<td>(F(df_1, df_2))</td>
<td>1.63 (7, 50)</td>
<td>0.98 (7, 46)</td>
<td>1.81 (7, 44)</td>
</tr>
<tr>
<td>(P)</td>
<td>.148</td>
<td>.458</td>
<td>.109</td>
</tr>
</tbody>
</table>

Differences by Age

No differences were found in knowledge, attitude, or perception by age using one-way ANOVAs. Results of the comparison are presented in Table 11.

Table 11. Comparison of Mean Scale Scores by Age.

<table>
<thead>
<tr>
<th>Age</th>
<th>Knowledge M (SD)</th>
<th>Attitude M (SD)</th>
<th>Perception M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-35</td>
<td>2.50 (0.18)</td>
<td>3.81 (0.80)</td>
<td>4.06 (0.39)</td>
</tr>
<tr>
<td>36-45</td>
<td>2.18 (0.69)</td>
<td>3.86 (0.43)</td>
<td>4.19 (0.60)</td>
</tr>
<tr>
<td>46-55</td>
<td>2.60 (0.82)</td>
<td>4.06 (0.30)</td>
<td>4.67 (0.66)</td>
</tr>
<tr>
<td>56-65</td>
<td>2.39 (1.00)</td>
<td>4.09 (0.79)</td>
<td>4.51 (0.55)</td>
</tr>
<tr>
<td>Over 65</td>
<td>2.88 (0.94)</td>
<td>4.08 (0.29)</td>
<td>4.18 (0.41)</td>
</tr>
<tr>
<td>(F(df_1, df_2))</td>
<td>0.80 (4, 53)</td>
<td>0.41 (4, 49)</td>
<td>0.51 (4, 47)</td>
</tr>
<tr>
<td>(P)</td>
<td>.534</td>
<td>.801</td>
<td>.194</td>
</tr>
</tbody>
</table>

Comparison of NP knowledge, attitude, and perceptions with sociodemographic variables of research yielded no correlational patterns. Knowledge deficits were noted among all participants regardless of nursing education level, gender, years of NP experience, or age.
Similarly, nursing education, gender, years of NP experience, and age had no bearing on NP attitude or perception regarding caring for IBS patient populations.

**Content Data Analysis**

Following the Knowledge, Attitude, and Perception sections of the survey, two open-ended questions were presented to determine: a) if NP thought they would benefit from additional education regarding IBS and IBS patient management; and b) which educational modality they would find to be the most useful to receive information about IBS and IBS management. Respondents were asked to explain their answers to both questions.

There were 51 respondents to the question regarding additional education for IBS and IBS management, of which 49 (96%) stated that they would benefit from additional education. Two respondents (0.04%) answered that they would not benefit from further education. Of the negative answers, one respondent stated they would not use the information in their practice. The other respondent reported little interest in functional GI disorders and time constraints within their practice for “needy IBS patients”. This respondent felt printed or audiovisual educational material would be more suited if tailored toward the IBS patient.

There were 54 respondents for the educational modality question as noted in Table 12.

<table>
<thead>
<tr>
<th>Table 12. Most Useful Educational Modalities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choices</td>
</tr>
<tr>
<td>Continuing education conferences</td>
</tr>
<tr>
<td>Lecture by gastroenterologist</td>
</tr>
<tr>
<td>Teaching videos</td>
</tr>
<tr>
<td>On-line presentation</td>
</tr>
<tr>
<td>Other modalities</td>
</tr>
</tbody>
</table>
Of this sample, 32 (59.26%) chose on-line presentation as their preference. Continuing educational conferences were the next most frequently requested at 16.67%. Further breakdown of the sample is noted in Table 12.
Chapter V
Discussion of Findings

Prior to discussing the study findings, it is necessary to revisit the primary purpose of this DNP scholarly project. Recall that current literature identified specific practice deficits among primary MDs regarding appropriate IBS diagnosis, management, and treatment. This practice deficit greatly disadvantages the IBS patient population as Rome criteria, PCP underestimation of patient disease severity, and viable treatment therapies are not accepted or utilized effectively. It is unknown if this practice deficit exists among NPs due to a paucity of literature surrounding this topic. Therefore, the primary purpose of this study was to examine the knowledge level of primary care NPs regarding IBS pathophysiology, appropriate IBS diagnosis, and evidence-based treatment for IBS and related symptoms. The second aim was to examine primary care NPs’ perceptions of caring for adult patients with IBS. The third aim was to examine primary care NPs’ attitudes regarding caring for adult patients with IBS. The fourth aim was to examine correlations between primary care NP’s knowledge level, perceptions, and attitudes and socio-demographic variables of research interest including age, gender, years in practice as a primary NP, and nursing education level.

Knowledge Results

Results indicated an overall knowledge deficit with regard to pathophysiology, appropriate diagnosis, and evidence-based treatment for IBS. Importantly, knowledge deficits were seen regarding appropriate diagnosis. This knowledge deficit included the use of Rome criteria to diagnose IBS and the evidence-based practice recommendations supporting Rome diagnostic criteria. These study findings highlight significant knowledge barriers regarding
appropriate diagnosis, and have potential to limit IBS patient care. This finding is in agreement with the literature that highlighted that although best practice standards are available, a considerable number of PCPs do not routinely follow them (Gikas et al., 2014). NP participants in this study reported this specific deficit.

The Knowledge Section of the survey posed two independent dietary questions to survey participants to evaluate their knowledge of “use of diets” as a means to manage IBS symptoms. Elimination and high fiber diets were the most prevalently prescribed at 55.9% and 47.5% respectively. The second independent question regarding diets assessed the NP’s knowledge of the FODMAP diet. A majority of respondents (62.1%) described themselves as having “no knowledge” of this diet. Elimination and high fiber diets have been found to be substandard in the amelioration of IBS symptoms when compared to the efficacy of the FODMAP diet. Moreover, high fiber diets have been found to increase bloating and abdominal discomfort (Ford et al., 2014), thus exacerbating symptoms. This knowledge barrier, identified by these study participants, poses additional limitations regarding symptom management and patient outcomes.

The assessment of evidence-based treatment options for IBS continued with additional survey questions regarding the “use of pharmacologic therapies”. Respondents overwhelmingly identified utilizing antispasmodics (76.3%) followed by bulking agents (49.2%) to treat IBS symptoms. The anticholinergic effect derived from antispasmodics may pose serious concerns for IBS patients and bulking agents provide a limited yield that may even exacerbate symptoms (Ford et al., 2014). Irritable bowel syndrome guidelines provide no evidence for current pharmacologic management as these medication options are largely ineffective in symptom control (Gikas et al., 2014). These findings further emphasize knowledge barriers among these NP participants.
Attitudes Results

The Attitude Section included both independent and scaled questions designed to identify potential NP barriers regarding their attitude towards IBS patients. The scaled items within the section did not identify specific attitude barriers or deficits among the study respondents. However, the independent question regarding “use of diagnostic test” did potentially identify an attitude barrier. Respondents were asked what if any diagnostic test should be utilized to diagnose IBS. Nurse practitioners participating in this study primarily chose colonoscopies (63.8%) and laboratory studies (58.6). Rome criteria encourages clinicians to make a positive diagnosis on the basis of symptom criteria without alarm signs (fever, gastrointestinal bleeding, weight loss, anemia, and abdominal mass) (Andresen et al., 2015). However, clinicians still predominantly diagnose IBS by exclusion. This inappropriate approach increases patient risk from unnecessary procedures, as well as, increases out of pocket costs. The utilization of colonoscopy and laboratory studies from these respondents highlights both a knowledge deficit with regard to appropriate diagnosis and an attitude barrier toward care of IBS patients. The motivation for use of diagnostic testing is unknown in this sample as further questions assessing this component were not presented. Understanding why clinicians continue to rely on unnecessary testing to diagnose IBS would enhance targeted education on this topic.

Perceptions Results

Findings from the Perception Section did not highlight specific barriers regarding how these NPs thought about IBS. A multitude of topics were covered within the scaled questions including: a) IBS as a chronic disease; b) symptom severity of IBS; c) limitations on a patient’s health related quality of life; d) if IBS patients miss more work or school than those patients without IBS; e) patients understanding of their illness; f) patients understanding of their care
The lack of barriers noted in this section suggest that if knowledge and attitudes barriers previously discussed are addressed, IBS patient care among this population could be optimized.

**Differences in Nursing Education, Age, and Gender**

Identifying any differences in knowledge, attitudes, and perceptions and sociodemographic variables of research was the last aim of this DNP scholarly project. Data analysis found no statistically significant correlations among knowledge, attitudes, and perceptions, and nursing education level, gender, age, or years of nursing experience.

**Limitations**

Several limitations were noted within this study. The sample size, variance of the sample respondents for each section, singularity of the sample characteristics, lack of geographical diversity are all limitations. The study results were derived from a small sample (N=64) of primary care NPs within the state of Florida who were active members of the FLANP. Thus, it is not possible to generalize the results beyond this sample. Although these study results do reflect the MD focused findings in current literature, it would be beneficial to have a larger sample size to assess for generalizability.

The sample characteristics identified the respondents as predominately female, middle-aged (>55 years), Caucasian, with MS/MSN level education. This convenience sample, although open to all members of the FLANP, showed little racial, ethnic, or age diversity. It is unknown if the study respondents’ characteristics are equivalent to the sociodemographic characteristics of the FLANP. Therefore, in future studies, strategies in study design should be implemented to address this lack of diversity.
The variance in the number of respondents to each of the survey sections further limited the generalizability of the findings. It is unknown why some respondents chose not to answer all the questions. Possible motivations could relate to survey length and time to complete. Regardless of the motivation, it is important to note that the coefficients of reliability for the Knowledge, Attitudes, and Perceptions sections were high.

The study design was a limitation in of itself. The Likert-Type scale answer design and “choose all that apply” option does not allow understanding of the barriers. The questions only identify that they exist. Moreover, the questions provide no insight regarding healthcare system related factors for either the provider or patient. The lack of understanding regarding these system related factors greatly impacts patient care and outcomes. This is seen though access issues, increased finances for both the health system and patient, and disruption of coordinated care. Further research should test the contributions of knowledge deficits identified in this study toward healthcare system related factors.

**Strengths**

Importantly, this study was to our research team’s knowledge, the first to examine NP’s knowledge, perceptions of, and attitudes toward IBS. This pilot study does provide new and relevant information regarding NP practice deficits regarding functional GI disorders.

This DNP project had several strengths built into the study design. Most importantly, the survey was sensitive to the study objectives. Barriers with regard to knowledge and perceptions of, and attitudes toward IBS were identified among primary care NPs. The survey demonstrated content validity and administration utility. The on-line survey design was cost effective, provided ease of administration, and secured delineation of inclusion and exclusion criteria.
As previously stated, the findings are in agreement with barriers previously identified in the literature regarding knowledge levels of primary care physician counterparts toward IBS. Primary care NPs in this study expressed knowledge deficits in pathophysiology, appropriate IBS diagnosis, and evidence-based treatment for IBS and related symptoms. This was particularly noted with the Rome diagnostic criteria questions, the poor familiarity and use of the FODMAP diet, and inappropriate use of diagnostic testing and pharmacologic therapies.

**Implications for Practice**

This DNP scholarly project did identify knowledge deficits regarding IBS by primary care NPs in Florida who are members of the FLANP. Although the small sample size of this study precludes generalizability, this pilot study may provide insight into barriers to appropriate care faced by IBS patients treated by primary care NPs with inadequate knowledge related to IBS and appropriate management. Use of evidence-based practice by NPs regarding IBS appropriate management could be promoted through targeted educational strategies with measurable outcomes.

**Implications for Research**

Recall that IBS poses significant direct and productivity-related cost burden to the US healthcare system including hospitalizations, outpatient visits, emergency room visits, procedures, and medication (Inadomi et al., 2003). These documented burdens are compounded by lack of or inappropriate use of the Rome Criteria for IBS diagnosis, and inappropriate use of diets to attenuate or prevent IBS symptoms. Thus, the data from this pilot data are planned to inform a future quasi-experimental study designed to test the effect of an DNP prepared NP-led educational intervention for NP knowledge regarding IBS pathophysiology, appropriate diagnosis with ROME criteria, when diagnostic testing is needed, understanding of appropriate
use of medical nutrition therapies to ameliorate IBS symptoms, and understanding the role and potential side effects of pharmacologic therapies.

**Conclusion**

This study addressed a gap in the literature regarding primary care NP knowledge level of IBS pathophysiology, appropriate IBS diagnosis, and evidence based treatment for IBS and related symptoms and is in agreement with reports in the literature of MD overall knowledge deficits with regard to IBS pathophysiology, appropriate diagnosis, and evidence based treatment and management. The identified knowledge deficit regarding appropriate care of the patient with IBS reported by this primary care NP sample is an important finding as this knowledge deficit may be related to increased primary care patient visits and related increased health care costs, performance of unnecessary medical procedures, and increased GI specialty referrals. Further research is warranted with a larger, more diverse sample to examine these potential outcomes.

Study results regarding no significant relationship seen between NP years of experience and their knowledge of IBS pathophysiology, appropriate diagnosis, and evidence-based management were interesting considering the reported high frequency in the US of annual primary care visits for IBS. Additionally, study results regarding participants’ non-adherence to evidence-based clinical practice guidelines for IBS is a key finding.

Study participants (98%) recognized their need for further education regarding IBS pathophysiology, appropriate diagnosis, and evidence based treatment and management. Thus, future research is warranted to test a targeted educational intervention to improve primary care NP overall knowledge level regarding appropriate clinical care of the patient with IBS.
Appendix A

Melnyk Level of Evidence

Levels of Evidence
Level 1 - Systematic review & meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analyses
Level 2 - One or more randomized controlled trials
Level 3 - Controlled trial (no randomization)
Level 4 - Case-control or cohort study
Level 5 - Systematic review of descriptive & qualitative studies
Level 6 - Single descriptive or qualitative study
Level 7 - Expert opinion

Appendix B

Nurse Practitioners’ Knowledge, Attitudes, and Perceptions Regarding Irritable Bowel Syndrome and Treatment Survey

The purpose of this research survey is to examine: a) knowledge level of primary care nurse practitioners (NPs) regarding irritable bowel syndrome (IBS) pathophysiology, appropriate IBS diagnosis, and evidenced based treatment for IBS and related symptoms; b) primary care NPs’ perception of caring for adult patients with IBS; and c) primary care NPs’ attitudes towards caring for adult patients with IBS.

If you are nurse practitioner practicing primarily in gastroenterology you are not eligible to participate in this study.

For purposes of this research study:

1. **Functional gastrointestinal (GI) disorders** is defined as “gastrointestinal conditions wherein diagnostic procedures such as laboratory testing (serum markers, stool studies, breath testing), radiographic imaging, esophagogastroduodenoscopy, capsule endoscopy, colonoscopy yield negative findings to account for the symptomology” (Drossman, 2016).

2. **Irritable bowel syndrome** is defined as “a symptomatic motility and sensory disorder of the lower GI tract, characterized by abdominal pain or discomfort associated with irregular bowel movements and the absence of detectable structural abnormalities” (Andresen et al., 2015).

3. **Medical nutrition therapy** is defined as “a therapeutic approach to treating medical conditions and their associated symptoms via the use of a specifically tailored diet devised and monitored by a medical doctor physician, nurse practitioner, registered dietitian, or professional nutritionist” (Morris et al., 2010).
INSTRUCTIONS

Please answer the following questions to the best of your knowledge. This survey will take approximately 20 minutes to complete. Thank you so much for your time.

ELIGIBILITY QUESTION

1. What is your advanced practice nursing specialty?
   - Family Practice
   - Acute Care
   - Women’s Health
   - Adult Geriatric
   - Pediatric Practice
   - Gastroenterology
   - Other. Please specify _______________________________

   If you responded with gastroenterology for your advanced practice nursing specialty you are not eligible for this study and you should not complete the survey.

DEMOGRAPHIC INFORMATION

Please fill in the information or select the best response(s) from the possible item choices.

2. What is your age?
   - 18-25
   - 26-35
   - 36-45
   - 46-55
   - 56-65
   - >65

3. What is your gender?
   - Male
   - Female

4. What is your ethnicity?
   - Hispanic or Latino
   - Not Hispanic or Latino

5. What is your race? Please select all that apply.
   - American Indian/Alaskan Native
   - Asian
   - Native Hawaiian or another Pacific Islander
   - Black or African American
   - Caucasian
6. What is your advanced practice nursing education level?
   - MS/MSN
   - Doctor of Nursing Practice (DNP)
   - PhD in Nursing
   - Other. Please specify _______________________________

7. How many years’ experience in advanced practice nursing practice do you have?
   - <1 year
   - 1-5 years
   - 6-10 years
   - 11-15 years
   - 16-20 years
   - 21-25 years
   - 25-30 years
   - >30 years

8. With which professional nursing association are you credentialed?
   - American Association of Nurse Practitioners (AANP)
   - American Association of Colleges of Nursing (AACN)

**KNOWLEDGE SECTION**

*Please select the best response(s) from the possible item choices.*

9. How would you rank your general knowledge of irritable bowel syndrome (IBS)?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

10. How would you rank your general knowledge of Functional Gastrointestinal Disorders (FGID)?
    - None
    - Some
    - Moderate
    - Good
    - Very good
    - Excellent

11. How would you rank your knowledge of pathophysiology of irritable bowel syndrome (IBS)?
    - None
    - Some
12. What experience level do you have caring for patients with irritable bowel syndrome (IBS)?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

13. What is your knowledge level of the use of the ROME III or IV diagnostic criteria to diagnose irritable bowel syndrome (IBS)?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

14. What is your knowledge level of evidence based practice recommendations supporting the ROME III or IV diagnostic criteria?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

15. What is your general knowledge level regarding the use of nutrition to manage irritable bowel syndrome (IBS)?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

16. What is your knowledge level regarding the use of medical nutrition therapy (MNT) to manage irritable bowel syndrome (IBS) related symptoms? *Medical nutrition therapy is defined as a therapeutic approach to treating medical conditions and their associated symptoms via the use of a specifically tailored diet devised and monitored by*
a medical doctor physician, nurse practitioner, registered dietitian, or professional nutritionist (Morris et al., 2010).

- None
- Some
- Moderate
- Good
- Very good
- Excellent

17. Which of the following diet(s) do you use to manage irritable bowel syndrome (IBS) patients. **Please select all that apply.**
   - FODMAP (fermentable oligo-, di-, monosaccharides, and polyol[FODMAP]) Diet
   - National Institute for Health and Care Excellence (NICE) Diet Guideline
   - Gluten Free Diet
   - High Fiber Diet
   - Low Fiber Diet
   - Elimination Diet (coffee, chocolate, insoluble fiber, and nuts)
   - Low Fat Diet
   - Other, please specify: ________________________________

18. What is your knowledge level regarding the FODMAP (fermentable oligo-, di-, monosaccharides, and polyol[FODMAP]) Diet?
   - None
   - Some
   - Moderate
   - Good
   - Very good
   - Excellent

19. Which of the following pharmacologic therapies do you use for symptom management of irritable bowel syndrome (IBS). **Please select all that apply.**
   - Antispasmodics
   - Laxatives
   - Bulking agents
   - Antibiotics
   - Tricyclic antidepressants
   - Selective Serotonin Reuptake Inhibitors (SSRI)

**ATTITUDE SECTION**

**Please select the best response(s) from the possible item choices.**

20. I believe the following diagnostic tests should be used when diagnosing irritable bowel syndrome (IBS). **Please select all that apply.**
   - Laboratory studies (e.g., serum markers, stool studies, and breath testing)
   - Radiographic imaging
21. I believe Irritable bowel syndrome (IBS) is a diagnosis of exclusion.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

22. I believe the ROME III or IV diagnostic criteria provide the ability to diagnose irritable bowel syndrome (IBS) at the initial clinic visit without additional testing.
   - Very Strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

23. I believe patients with irritable bowel syndrome (IBS) clinical signs require extended clinic visit time to address concerns.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

24. I believe patients with irritable bowel syndrome (IBS)-related symptoms require extended clinic visit time to address concerns.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

25. I believe patients with irritable bowel syndrome (IBS)-related symptoms require more individual therapeutic time than patients without irritable bowel syndrome.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
26. I believe it is easy for the nurse practitioner to create a care plan for patients with irritable bowel syndrome (IBS) symptoms.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

27. I believe it is easy for the nurse practitioner to assist irritable bowel syndrome (IBS) patients to adhere to their care plan.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

28. I believe it is satisfying to treat patients with irritable bowel syndrome (IBS) related symptoms?
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

**PERCEPTION SECTION**

_Please select the best response from the possible item choice._

29. I think irritable bowel syndrome (IBS) is a chronic disease.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

30. I think irritable bowel syndrome (IBS)-related symptoms may be severe.
   - Very Strongly agree
   - Strongly agree
   - Agree
31. I think irritable bowel syndrome (IBS) may limit a patient’s health-related quality of life.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

32. I think irritable bowel syndrome (IBS) may **SEVERELY** limit a patient’s health related quality of life.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

33. I think patients with irritable bowel syndrome (IBS) miss more days of work than patients without irritable bowel syndrome (IBS).
   - Very Strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

34. I think patients with irritable bowel syndrome (IBS) miss more days of school than patients without IBS.
   - Very Strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

35. I think patients with irritable bowel syndrome (IBS) have a good understanding of their diagnosis.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree
36. I think patients with irritable bowel syndrome (IBS) have a good understanding of their care plan.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

37. I think patients play an important role in their irritable bowel syndrome (IBS)-related symptom management.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Very strongly disagree

**OPEN-ENDED QUESTION SECTION**

*Please enter your responses for the following two questions.*

38. Do you think you would benefit from additional education regarding irritable bowel syndrome (IBS) and IBS patient management? Why or why not?

39. Which educational modality would be the most useful for you to receive information about irritable bowel syndrome (IBS) and IBS management? Please explain your answer.
   - Continuing educational conferences
   - Lecture by gastroenterologist
   - Teaching videos
   - On-line educational presentation
   - Other educational modalities (please specify)
References


http://dx.doi.org/10.4103/1319-3767.96450


http://dx.doi.org/10.1177/2050640614558344


http://dx.doi.org/10.1038/ajg.2013.105


http://dx.doi.org/10.1038/ajg.2010.47


http://dx.doi.org/10.111/j.1365-2982.2005.00750.x


http://dx.doi.org/10.1097/MEG.0b013e328348a552


http://dx.doi.org/10.3748/wjg.v22i7.2219


http://dx.doi.org/10.1038/ajg.2013.15

http://dx.doi.org/10.1016/S0016-5085(16)30841-1

http://dx.doi.org/10.1016/s0016-5085(16)03066-5

http://dx.doi.org/10.1038/ajg.2014.187

Florida Board of Nursing. Retrieved from
http://floridasnursing.gov/licensing/advanced-registered-nurse-practitioner/

E., Speigel, B., M., & Moayyedi, P. (2014). Efficacy of prebiotics, probiotics, and
synbiotics in irritable bowel syndrome and chronic idiopathic constipation: systematic
http://dx.doi.org/ 10.1038/ajg.2014.202

bacterial overgrowth in irritable bowel syndrome: Systematic review and meta-analysis.
Clinical Gastroenterology and Hepatology 7(1), 1279-1286.
http://dx.doi.org/10.1016/j.cgh.2009.06.031

patients with irritable bowel syndrome. Data from a German urban area. Romanian
Journal of Internal Medicine 47(1), 47-53.

Galvez-Rios, S., Rivera Gutierrez, X., J., Liceaga, H., A., T., Sanchez-Maza, Y., Sosa, O.,
R., Perez-Luna, E., Meixueiro, A., Dietlen, F., R., Gomez-Castanos, P., Cp., balmori, M.,
A., & Troche, J., M., R. (2016). Effects and predictors to response of a low FODMAP
diet compared to a high FODMAP diet. results of a short term, randomized, crossover
study in Mexico. Gastroenterology 150(4), 742-743.
http://dx.doi.org/10.1016/S0016-5085(16)32521-5


International Foundation for Functional Gastrointestinal Disorders, Inc. (IFFGD).


http://dx.doi.org/10.1093/fampra/cmg608

http://dx.doi.org/10.3748/wjg.v22.i15.4009

http://dx.doi.org/10.1007/s00394-015-0922-1


http://dx.doi.org/10.1016/S0016-5085(16)33218-8

Miazga, A., Osinski, M., Cichy, W., & Zaba, R. (2015). Current views on the etiopathogenesis, clinical manifestations, diagnosis, treatment, and correlation with other nonsiological entities of SIBO. Advances in Medical Sciences 60, 118-124.
http://dx.doi.org/10.1016/j.advms.2014.09.001

http://dx.doi.org/10.1038/ctg.2015.21

http://dx.doi.org/10.1097/MCG.0b013e31821fbf44.


Retrieved from http://www.neumansystemsmode.org


http://dx.doi.org/10.1016/j.gie.2014.02.1020


*Alimentary Pharmacology and Therapeutics 41*(1), 1256-1270.

http://dx.doi.org/10.1111/apt.13167


The Rome Foundation. Retrieved from

https://www.ibsregister.com/ibs_professional_info/rome_iii/


http://gut.bmj.com/content/gutjnl/62/5/787.full.pdf
http://dx.doi:10.1136/gutjnl-2012-302504


http://dx.doi.org/10.1016/s0016-5085(16)30842-3


http://dx.doi.org/10.3912/OJIN.Vol18No02Man04

SurveyMonkey Plans and Pricing (2016). Retrieved from

https://www.surveymonkey.com/pricing/?ut_source=help_center_plans