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Running head: H.PYLORI INFECTION PROTOCOL TOOL

Providers' Knowledge Assessment and Development of the
H. Pylori Infection Management Protocol Tool

DNP Project

Submitted in Partial Fulfillment of the Requirement

for the Degree of Doctor of Nursing Practice

St. Catherine University

St. Paul, Minnesota

Zahra Abdi Roble

May 12, 2018

H.PYLORI INFECTION PROTOCOL TOOL

ST. CATHERINE UNIVERSITY

ST. PAUL, MINNESOTA

This is to certify that I have examined this Doctor of Nursing Practice DNP project manuscript written by *Zahra Abdi Roble* and have found that it is complete and satisfactory in all respects, and that any and all revisions required by the final examining committee has been made.

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May 12, 2018

DEPARTMENT OF NURSING
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Abstract: The prevalence of Helicobacter Pylori (H. Pylori) infection for the Somali population has increased, and there is a significant need to expand Health Care Providers' (HCPs') knowledge regarding the correlation between Somali cultural practice and the transmission of H. Pylori infection. HCPs have a central role in the early detection and management of H. Pylori infection, as well as making valid diagnosis and treatment decisions that minimize the risk of complications. The purpose of this Doctor of Nursing Practice (DNP) project was to evaluate HCPs' knowledge regarding H. Pylori infection treatment management, guidelines usability, and Somali culture awareness to identify where the knowledge gap exists. Evidence-based practice was combined with cultural knowledge to present best practice for educational resources related to the treatment of H. Pylori infection to improve outcomes in the Somali immigrant population. This quality improvement (QI) project presents an algorithm to increase HCPs confidence and knowledge of best practices in H. Pylori infection treatment in the Somali population.

Purpose: The aim of this DNP project was to develop a culturally competent protocol tool that HCPs at an inner city Federally Qualified Healthcare Center (FQHC) in Minneapolis can use for assessment, treatment, and prevention of the H. pylori infection in the Somali immigrant population.

Theoretical Underpinnings for Quality Improvement (QI): The two change theories that specifically influenced this QI project were Dr. Josepha Campinha-Bacote's (2002) culturally competent model of care and Lewin's Change Theory (1951). These theories can be utilized to design an educational program that promotes the ability of HCPs to change their attitude and meet the needs of diverse patients more efficiently.

Quality Improvement Process Goals: The first goal was to evaluate HCPs' knowledge deficits regarding H. pylori infection management guidelines and Somali culture. The second goal was to

develop and introduce understandable educational resources, such as an evidence-based protocol tool for management of H. Pylori infection specifically designed for Somali immigrant patients in a primary care clinic. The third goal was to evaluate the HCPs' knowledge regarding the effectiveness of the H. pylori infection protocol tool and culturally sensitive educational resources to determine whether this strategy improved the health outcomes for Somali patients.

Methods: Two data elements were collected. The first data element was a pre-survey to evaluate providers' knowledge of the current guidelines pertinent to the H. pylori infection management, as well as Somali culture and disease transmission. The second data element was extracted from a review of ten patients' randomly selected charts to evaluate guideline adherence and how many patients were tested, treated, or referred to a specialist. Based on the survey results and charts reviewed, the DNP student provided a culturally competent tool and educational resource to the HCPs about H. Pylori infection assessment, treatment, and prevention in the Somali immigrant population. Finally, the post-survey results were conducted to evaluate the effectiveness of the H. Pylori infection protocol tool and culturally sensitive educational resources.

Evaluation Methods: This mixed methods approach allowed exploration of this QI project's question: *"How well do Health Care Providers (HCPs) at an inner city Federally Qualified Healthcare Center (FQHC) in Minneapolis adhere to and perceive the usability of a protocol tool designed for the assessment, treatment, and prevention of H. Pylori infection in the Somali immigrant population?"* and *How does HCPs' knowledge of H. Pylori infection treatment change after an educational intervention?"*

Conclusion: HCPs have a central role in the early detection and management of H. Pylori infection. Making valid diagnosis and treatment decisions, and minimizing the risk of complications are essential. This DNP project improved providers' knowledge and

understanding of H. pylori infection treatment management in a Somali community. This manuscript reveals that updating knowledge and skills of HCPs via continuing educational intervention is the best way for adherence to guidelines and improving the quality of care for patients with H. Pylori infection diseases. This QI project demonstrated that a brief educational intervention could improve HCPs' knowledge of when, how, and where to use appropriate treatment for patients with H. Pylori infection, as well as how to provide culturally sensitive guidance to reduce transmission of the disease.

Keywords: *H. Pylori infection prevalence, prevention, treatment; Health Care Providers (HCPs') knowledge; guideline adoptions; HCPs' guideline adherence; primary care; Somali population; African, immigrants.*

Introduction

Many immigrants come to the United States every year, and they come from different regions of the world. They have brought with them health risks and diseases common to all immigrant populations as well as some conditions that may be unique to the particular community (United States Department of Health & Human Services [USDHHS], 2012). Immigrants also have extremely high rates (94%) of H. Pylori infection, which increases the risk for gastric cancer and indicates that H. Pylori infection is a serious public health problem (Wang & Adair, 1999). Providing education should help raise awareness about the negative health impacts of this disease and overall disease management. Furthermore, managing behavior that influences the progression of the disease is needed to prevent H. pylori infection in this population, or the high rate will most likely continue.

By the year 2050, the U.S. Commerce Department projects that 50% of the population of the United States will be non-European or minority individuals (U.S. Department of Commerce,

2001). With these demographic changes, HCPs need to update culturally sensitive interventions. According to Kikuchi (2005), inadequate knowledge of cultural factors will represent a missing ability to provide care. In addition, healthcare providers may experience culture shock and feel helpless to assist a patient who so openly expresses different cultural patterns and ways he/she wants to receive care. Furthermore, understanding a patient's cultural norms can allow HCPs to build a healthy relationship with their patient, which will increase patient and provider communication (Carroll et al., 2007). Providing educational intervention will raise awareness about the negative health impacts of this disease and overall disease management.

Background of the Study

Many pathogens can be transmitted by direct contact from person to person, and H. Pylori is one of these pathogens. H. Pylori is a Gram-negative bacterium that remains one of the most common worldwide human infections that cause digestive diseases such as gastro-esophageal reflux, duodenal ulcer, peptic ulcer, chronic gastritis, and gastric cancer (Linz et al., 2007; Chey; Wong & the Practice Parameters Committee, 2007). Nearly all-gastric cancer cases, (95%) result from H. Pylori infection. H. Pylori infection also causes more than 90% of gastric mucosa-associated lymphoid tissue (MALT) lymphoma cases (Hunt et al., 2011).

The main ways to transmit H. Pylori infection is direct contact from person-to-person by oral-to-oral or fecal-to oral, contaminated water or food, and crowded living conditions (Brown, 2000; Kivi & Tindberg, 2006). This pathogen remains prevalent worldwide, but some populations are more susceptible than others. According to Hooi et al. (2017), approximately half of all humans are infected with H. Pylori. In 2015, 4.4 billion individuals worldwide were estimated to be positive for H. Pylori infection (Hooi et al., 2017, pg. 423). Elimination of this

common gastric pathogen can decrease the prevalence of gastrointestinal ulcers and gastric cancer (Chey et al., 2007).

Even though the prevalence of H. Pylori is declining in some parts of the world (especially Western world), the infection remains present in 28% to 84%, depending on the population tested (Fallone et al., 2016). Even in Western nations, which tend to have the lowest prevalence, there have been a reported high proportion of infected individuals in certain communities (Fallone et al., 2016). In addition, the estimated prevalence of H. Pylori infection is 70% in developing countries such as Africa and Asia, and 30% -40% in the United States and other industrialized nations of the Western world ((Chey et al., 2007; Henry 2016; Hooi et al., 2017).

According to Hooi et al. (2017), there are significant differences in the H. Pylori prevalence even within the same country. These differences in H. Pylori prevalence likely reflect the level of urbanization, sanitation, access to the clean water, and socioeconomic status (Hooi et al., 2017). In the United States, the ethnic and racial differences have been noted regarding H. Pylori infection prevalence. H. Pylori infection prevalence in the non-Hispanic white population ranges from 18.4% to 26.2%, non-white population ranges from 34.5% to 61.6%, and can be as high as 75% in the Alaskan Native population (Hooi et al., 2017). Hooi and colleagues also identified that lack of adequate sanitation, unsafe drinking water, and overcrowded living all play a role in determining the increasing prevalence of the H. pylori infection.

Although H. Pylori infection is curable and preventable, marginalized populations often have a higher risk for H. Pylori infection and its multiple body system effects. The complications related to this pathogen affect other body systems as well. Studies by Longo-Mbenza et al. (2012) and Testerman and Morris (2014) demonstrated that H. Pylori is correlated with

additional risk factors for heart disease, such as diabetes mellitus, arterial hypertension, and high levels of serum fibrinogen, total cholesterol, and low HDL cholesterol. Li and colleagues (2017) also found that there is a significantly higher prevalence of H. Pylori infection in diabetes mellitus patients as compared to non-diabetes patients. In addition, the difference is associated with type II diabetes mellitus but not type I diabetes mellitus (Li et al., 2017). Furthermore, there is a positive association between H. Pylori infection and the risk of Hepatocellular carcinoma. H. Pylori was detected in hepatic-carcinoma tissue for 13 out of 15 patients, and not in non-tumor cells (Xuan et al., 2008). Other studies identified that H. Pylori also impairs cytochrome P450 in patients who were hepatitis c virus (HCV) positive and had liver cirrhosis (Giannini et al., 2003; Ito et al., 2004).

Somali patients are at high risk for H. Pylori infections due to an information gap on the immigrant. As a result, immigrant health outcomes are frequently reported in general rather than specific terms. Therefore, there is little data to support the prevalence of H. Pylori in the Somali community, and it is difficult to find because researchers tend to classify Somali patients as an immigrant, African, non-Hispanic Black, African American/Black, or ethnic minority. The only resource found is Wang and Adair (1999), which estimated the prevalence of H. Pylori infection in the Minnesota for an adult from East Africa is as high as 94%. Wang and his colleagues also mentioned that the prevalence varies, but it is greater in immigrants. The Minnesota Department of Health (MDH, 2005) identified significant health disparities between some immigrant groups than other Minnesotans. In addition, the MDH and the Central Disease Control and Prevention (CDC) do not have new guidelines because, in the general population, the disease outbreak has not been reported in the last ten years.

Problem Statement

H. Pylori is a bacterial infection that can cause a multitude of gastrointestinal symptoms and is correlated with a higher risk of stomach cancer. H. Pylori infection and associated atrophic gastritis are the main risk factors for gastric cancer (Brown, 2000). Many Somali patients who have been infected with H. Pylori infection visit a nonprofit community primary care clinic in Minneapolis. This non-profit community primary care center in Minneapolis provides care to a large population of Somali patients, many of who have tested positive for the H. Pylori infection. These patients have suffered from abdominal pain, frequent burping, bloating, nausea, vomiting, poor appetites, weight loss, indigestion, and/or reflux (J. Sadiiq personal communication, May 24, 2017). These typical patients also have presented with other symptoms such as fainting, syncope, heart palpitation, and fatigue, which make it difficult for HCPs to diagnosis this disease early. There are increased risks of health disparities at these FQHC clinic patients because there has been no research done on why the Somali community has a high prevalence of the H. Pylori infection. Due to the lack of inquiry and research of this infection in this population, the Somali community struggles to get management and treatment of this disease.

Cultural Background and Disease Transmission

Somalia is an East African Country with a population of 9.5 million, 99.9% of them are Muslim (Esse, 2008). Their official language is Somali. In addition, the other languages that Somali people speak include Italian, English, and Arabic. Somalis have an oral culture, but a formal written language was introduced in 1972 (Drake; Mutua & Kombo, 2009). Somali refugees began migrating to the US after the eruption of the civil war in 1990 (Robillos, 2001). Somalis are among the fastest growing group of immigrants in Minnesota (Venters & Gany, 2011). According to 2010 American Community Survey data, Minnesota has the largest Somali

population in the United States and the majority of Minnesota Somalis live in Minneapolis and St. Paul. The survey estimated that of the 85,700 Somalis living in the United States, more than 32,000 Somalis are living in Minnesota (Stratis Health, 2012).

Culture is essential in assessing a patient's health and well-being. Understanding a patient's cultural norms can allow HCPs to build a healthy relationship with their patient, which will increase patient and provider's communication (Carroll et al., 2007). Additionally, cultural competence in health care is one of the most significant ways to reduce health disparities for minority populations (Pavlish, Noor & Brandt, 2010). Somali patients are at high risk for H. Pylori infections due to living together with extended families, sharing foods, and eating with hands, which is common in the Somali community (Centers for Disease Control [CDC], 2008). This disregarded cultural norm is an important aspect of caring for Somali patients and providers must be aware of their patients' cultural differences, which can influence their disease transmission. According to Kikuchi (2005), inadequate provider knowledge of their patient's culture will lead to culturally incompetent care and an increase in H. Pylori infection. The healthcare professional must incorporate cultural values, beliefs, and expectations of their patient to provide holistic care.

Primary Care Clinic HCPs' Knowledge Deficit

While culture is important in the care of diverse populations, there is also a need for HCPs to utilize evidence-based and practice guideline to achieve the best H. Pylori infection treatment management. There are a few experienced providers who are trying to manage H. Pylori infection at the center of this project. However, these providers do not have a protocol tool to follow for the assessment, treatment, and preventative measures for this population. Furthermore, there are multiple clinical practice guidelines on the assessment, treatment,

prevention of the H. Pylori and multiple educational sites for the providers and patients, such as the *American College of Gastroenterology guideline (ACG)*, *National Institute for Health and Clinical Excellence (NICE)*, *American Gastroenterological Association (AGA)* and *Scottish Intercollegiate Guidelines Network (SIGN)* (Hunt et al., 2011). Furthermore, the US Centers for Disease Control and Prevention (CDC) also established an H. Pylori infection website and information line for HCPs and patients (CDC, 2008). In addition, none of these guidelines or educational tools was utilized at the clinic at the time this project was initiated.

HCPs at this primary care clinic are not the only providers who do not use the H. Pylori infection treatment management guidelines; it is a global HCP's problem. A study conducted in Ireland identified that only 60% of the H. Pylori positive patients received appropriate treatment, and almost a quarter received no treatment at all (Gikas & Triantafillidis, 2014). Inappropriate treatment of H. Pylori infection in primary care indicated that guidelines are not well implemented in practice. A lack of protocol guidance has led to delayed treatment and unnecessary cost in care such as repeat visits and referrals to specialists (Gikas & Triantafillidis, 2014). Recent review of 34 Somali patients charts, who were seeking primary care in two months period in the FQHC clinic where this QI project was conducted, revealed that 38% of patients were positive for H. Pylori infection, only 29% got treatment, nearly nine percent (8.8%) were referred to a specialist, and the same number of patients (8.8%) did not return for treatment (H. Magruder personal communication, March 24, 2017).

The lack of a protocol tool has led to delayed treatment, increased utilization of healthcare services in the form of repeat visits and referrals to specialists, and possibly an increased gastric cancer rate (Gikas & Triantafillidis, 2014). There is a global lack of HCPs' knowledge about H. Pylori infection treatment management. Ahmed and his colleagues (2009)

conducted a cross-sectional study to assess if primary care physicians (PCP) in a developing country have enough knowledge to manage H. Pylori infection. The study was conducted in Pakistan, and 451 PCPs consented to participate. A self-administered pretested questionnaire was used. Only 426 of the 451 PCPs were evaluated, and data revealed that many primary care providers lack knowledge regarding management of the H. Pylori infection. Ahmed and his colleagues recommended more teaching programs and continuous educational interventions regarding H. pylori infection management for PCPs (Ahmed et al., 2009).

Increasing providers' knowledge regarding Somali culture and having useable guidelines are essential in achieving the best assessment, treatment and prevention of the H. Pylori infection. In addition, failure of utilizing evidence-based care will increase the incidence of H. Pylori infection and inefficiency costly care (Gikas & Triantafillidis, 2014). Furthermore, the implementation of this QI project may help in further closing the gap between evidence regarding H. Pylori infection assessment, treatment, and prevention recommendations and current practices by primary care providers.

Purpose Statement

This QI project focused on the HCPs who care for the immigrant population in a primary care clinic that serves a large Somali population. This center is located in Minneapolis. The purpose of this DNP project was to develop a protocol tool that HCPs can use for the assessment, treatment, and prevention of the H. Pylori infection in the Somali immigrant population. The protocol tool takes Somali culture into consideration and assist clinicians caring for patients with H. Pylori infection to understand the background and cultural context of the Somali population: *"How well do Health Care Providers (HCPs) at an inner city Federally Qualified Healthcare Center (FQHC) in Minneapolis adhere to and perceive the usability of a protocol designed for*

the assessment, treatment, and prevention of H. Pylori infection in the Somali immigrant population?” and How does HCPs’ knowledge of H. Pylori infection treatment change after an educational intervention?” It is assumed that when HCPs have adequate knowledge of the H. Pylori infection and receive educational intervention about the culture of their patients, there is a positive impact on patient outcomes. Discovering knowledge that could be used to provide culturally tailored care that is meaningful, safe, and satisfying to people of diverse culture is essential. The use of a protocol tool allows for a simplified educational process as well as creates a sustainable solution (Gikas & Triantafillidis, 2014).

Critical Review of the Literature

A thorough review of the current H. Pylori infection treatment management literature was conducted to provide the background for this project. In order, to investigate this subject in detail, the literature search needed to identify providers' knowledge, adherence, and adoption of the guidelines, Somali cultural awareness and potential roles of the HCP in the comprehensive treatment management of the H. Pylori infection in general.

Relevant evidence was found through searching the following databases Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline via EBSCO, Cochrane Library, PubMed of the National Library of Medicine and Google Scholar. The MeSH, an advanced search builder was used for PubMed search to filter the database. Furthermore, evaluating reference lists of reviewed articles also identified more articles. Each database was searched using Keywords: *H. Pylori infection prevalence, prevention, treatment; Health Care Providers (HCPs') knowledge; guideline adoptions; HCPs’ guideline adherence; primary care; Somali population; African, immigrants.* The database search showed large numbers of articles, which were acquired and abstracts were reviewed to determine content and types of studies in

order to narrow down these articles. If articles met the criteria to support the QI project's intervention, then the articles were appraised for the level of evidence to support the Evidence Based Practice (EBP) project and to provide a guideline for the use of an HCP education program.

The *inclusion criteria* consisted of the following systemic reviews of randomized control trials with or without meta-analysis, surveys studies, non-experimental studies, English-language published articles from peer-reviewed scholarly journals, and full-text articles only. Additional inclusion criteria were H. Pylori infection comprehensive treatment management in the primary care setting, cultural competency, studies that evaluated providers' knowledge of H. Pylori infection with guideline adherence as an intervention, and studies that were published from 1999 through 2017. *Exclusion criteria* consisted of articles defined as non-English, outside the set timeframe or not relevant to the project, duplicate commentary articles, and studies that were poor quality or low evidence level based on the Johns Hopkins Nursing Evidence-Based Practice tool.

Synthesis of the Literature

This literature review aimed to synthesize the evidence from the literature to identify if educational and cultural context interventions increase providers' knowledge regarding H. Pylori infection treatment management in the Somalia immigrant population. In addition, the second aim of this literature review was to identify recommendations for changing practice based on the level and quality of the data and evidence. After careful review of the abstracts, the most relevant eight articles were selected based on the uniqueness of the DNP project's PICO question and Johns-Hopkins Nursing Evidence-Based Practice tool (Johns Hopkins Nursing Evidence-Based Practice, 2017).

Each article was evaluated to identify the characteristics of the article, such as author, publication date, evidence type, sample size, setting, study findings that support the intervention, limitations, and evidence level and quality. One article was level I, and the other seven articles were level three. Three articles were high quality, and the remaining articles were good quality. These articles were non-experimental research and were quality improvement studies that mostly focused on providers' knowledge regarding H. Pylori infection, treatment, prevention, and their use of proper H. Pylori guidelines in the primary care practice settings. All of these articles were deemed relevant to the DNP project. The reviewed studies focused on HCP education, guideline usability, adherence, and HCP 'cultural competency training and outcomes related to HCPs' educational intervention. Some other articles focused on the providers' knowledge regarding the adaptation of H. Pylori infection clinical guidelines and how an educational intervention would be most effective.

Providers' Knowledge Assessment/Guideline Usability and Adherence

The failure to adhere to guidelines is a problem that transcends all specialties and sectors of care. Misra and Barth (2016) evaluated HCPs practice for the H. Pylori infection guidelines usability, and results revealed that these guidelines are utilized and adhered to in clinical practice, but these studies also identified that the HCPs lacked awareness with the guidelines usability.

Kim et al. (2006) conducted an observational, transverse study using a self-administered questionnaire. The study was to evaluate the attitudes of primary care physicians in the diagnosis and treatment guidelines for H. Pylori infection in Korea. Primary care providers in the metropolitan area of Seoul were randomly selected. One hundred and eight HCPs responded to the questionnaire. The survey results identified that 26.9% of HCPs conduct H. Pylori testing and

the majority of HCPs prefer the rapid urease test or biopsy to test H. Pylori infection. Furthermore, 25% of the HCPs frequently test for H pylori in cases of gastritis and response to a patient's request. Twenty-eight point seven percent (28.7%) of HCPs always treat patients who have an H. Pylori infection positive test result and 28.7% of HCPs treated H pylori on a patient request basis. Forty point seven percent (40.7%) of HCPs prescribed the same medication after the first eradication failed. Sixteen point seven percent (16.7%) of HCPs changed to another triple regimen and 25% to a quadruple regimen. Therefore, nine percent (9%) of HCPs recommended a follow-up testing after H. Pylori treatment (Kim et al., 2006).

A study by Kim and colleagues (2006) also identified that the utilization of guidelines has little impact on practice. This study recommended more communication programs, such as continuous educational intervention between primary care and gastroenterologists. Schemes designed to ensure guidelines implementation in primary care setting are crucial (Kim et al., 2006). Additionally, international guidelines and the World Gastroenterology Organization (WGO) practice guidelines are underutilized in primary care practices (Ahmed et al., 2009). Multiple studies revealed that there are significant gaps between the attitudes and practice of HCPs regarding H. pylori infection management and published guidelines (Boltin et al., 2016; Lugtenberg et al., 2011).

Canbaz, Sunter, Peksen, and Leblebiciouglu (2005) administered a questionnaire to general practitioners in nineteen primary health care centers in Turkey. The study was to evaluate the general practitioners' (GPs) knowledge and practices about H. pylori infection. The survey results identified that general practitioners lacked knowledge regarding the difference between symptomatic and asymptomatic individuals. Canbaz et al. (2005) proposed that general practitioners preferred to treat the patients with suspected ulcer empirically or by sending them to

a specialist. Most studies recommended to continuing educational intervention for HCPs, which will improve the HCPs' knowledge regarding H. pylori infection management and guideline adherence (Ahmed et al., 2009; Boltin et al., 2016; Canbaz et al., 2005; Kim et al., 2006).

Health Care Providers' Educational Intervention

To increase the quality of patient care, HCPs need to utilize evidence-based practices (EBP), which increase positive outcomes in H. Pylori infection management care. Walsh (2008) conducted a study to identify whether online educational intervention modules increase primary care practitioners' (PCPs') knowledge in the area of infectious diseases including H. pylori. Wilcoxon's test was used to evaluate if the modules increased PCPs' knowledge to a statistically significant degree, and qualitative feedback also was used to find out if PCPs found the modules as useable tools. The peer-reviewed online modules included interactive case studies, histories on contagious diseases, graphics, and illustrations. The modules involved pre and post-test questionnaires. Over 3,956 PCPs completed the educational intervention modules. Eighty-six percent of the participants were general practitioners, and 14% were practice nurses. The results demonstrated that online educational resources are helpful and increased PCPs knowledge regarding infectious diseases to a significant degree ($p < 0.001$). The 1,251 responses gave positive feedback, and participants' feedback demonstrated that PCPs gained knowledge from the educational intervention modules. Additionally, many PCPs stated that they had learned a lot and they also planned to change their practice after the educational intervention (Walsh, 2008).

Ekundayo et al. (2013) performed a survey questionnaire to assess healthcare workers' best practice knowledge regarding Child Passenger Safety (CPS) as well as to evaluate the impact of a brief lunch –and- learned educational intervention for healthcare workers. The study took place in healthcare facilities in seven cities in the United States where culturally diverse

populations were common, especially African American, and Hispanic families. The study population was 216 heterogeneous healthcare workers. At the educational training session, the participants were given a pre- and post-survey questionnaire followed by 20 minutes of questions and answers (Ekundayo et al., 2013). McNamara's chi-square tests were used to identify if the healthcare workers' knowledge increased between pre and post-intervention assessments. The participants who answered the question on "when children are ready to graduate from a booster seat to wearing lap-shoulder belts" were 27.8% before intervention and increased to 98.1% after the intervention. The respondents who correctly answered the question "what age are children safest riding in the back seat" were 15.3% before the educational intervention, compared to 86.1% after the intervention. The study demonstrated that the pre-post knowledge improvement in the present results supports the additional hypothesis that a brief educational intervention increased healthcare workers knowledge regarding CPS (Ekundayo et al., 2013).

Cultural Awareness for HCP Educational Intervention

Beach et al. (2005) performed a systematic review evaluating an educational intervention to improve the cultural competence of HCPs. The authors reviewed 34 educational intervention studies specifically designed to improve the cultural competence of HCPs. The authors measured both the providers' outcomes (such as knowledge, attitudes, and skills) and patients' outcomes (such as satisfaction, adherence, and health status). Some studies tested students on specific cultural concepts, while other studies tested students on general cultural concepts, but no two studies reported using the same knowledge assessment tool. Almost all of the studies, 17 out of 19, provide evidence that cultural competence training improves the knowledge of healthcare professionals. Twenty-one out of twenty-five studies evaluated the providers' attitudes, and these studies demonstrated that cultural competence training improves HCPs' attitudes.

Additionally, 14 out of 14 studies evaluating skills revealed a beneficial effect from this training. Moreover, three out of three provided good evidence that cultural competence training improved patient satisfaction (Beach et al., 2005). Even though these studies used different knowledge assessment tools, interventions that taught both general and specific cultural concepts were all associated with positive outcomes. Although the educational interventions were short in duration, providing a cultural competency educational program not only improved knowledge and attitudes of the HCPs but also increased positive satisfaction for their patients. In aggregate, the studies in this systematic review revealed that educational interventions are effective and can improve patient care. Finally, the authors found evidence that cultural competence training improves the knowledge of the HCPs (Beach et al., 2005).

Results of the Literature Review

The literature review identified that educational interventions improve HCPs' knowledge. The articles demonstrated that educational intervention has a potential impact on HCPs' attitude, knowledge, and skills, as well as increases their cultural awareness (Beach et al., 2005). The literature review results supported the primary outcome of post-intervention knowledge of HCPs, which shows that a brief educational intervention can improve healthcare workers' knowledge (Ekundayo et al., 2013). Furthermore, it is also clear that less active interventions that did not include an interpersonal component are less effective in achieving improvements in quality of care and education (Majumdar et al., 2005). In general, these studies emphasized the need to not only provide educational resources regarding guidelines usability and adherence, but also to provide a culturally sensitive educational intervention (Beach et al., 2005).

Recommendations for Practice Change

HCPs play an important role in the care of their patients, so educating HCPs is an essential element of successful patient care management. In other words, there are enough clear guidelines for H. Pylori testing and treating; those guidelines must be understood and followed by HCPs. H. pylori infection is a significant public health concern and HCPs are at the lead of H. pylori treatment management. Overall HCPs' adherence to H. pylori treatment management guidelines is low. Public health agencies should advance educational interventions to close these gaps (Boltin et al., 2016).

Most of the studies of educational interventions demonstrated the need to not only provide education regarding guideline but also provide culturally competent educational interventions are very important. These studies generally identified that educating HCPs in a multilayered educational intervention increases knowledge, improves patient outcomes, and leads to better patient quality of life. In addition, every article demonstrated that continued educational training services will increase HCPs' knowledge and as well as improve the care that they provide to their patients (Ahmed et al., 2009; Beach et al., 2005; Boltin et al., 2016; Canbaz et al., 2005; Ekundayo et al., 2013; Huang et al., 2003; Kim et al., 2006 & Majumdar et al., 2005). Multiple studies indicated that continued HCPs' educational intervention is one of the best recommendations (Huang et al., 2003 & Majumdar et al., 2005).

Implementation of Guidelines in Practice

Clinical practice guidelines are statements such as recommendations intended to optimize patient care. Guidelines aim to standardize practice based on best available evidence. Guidelines also assist decision-making by clinicians and patients about appropriate health care for specific clinical situations including clarification of areas of confusion regarding patients' care and

streamlining pathways (Pronovost, 2013). However, the real purpose of the guidelines is to improve patient care and outcomes (Misra & Barth, 2016). Introducing H. Pylori infection guidelines to HCPs and providing alternative options for the assessment, treatment and prevention of H. Pylori infection is needed. The utilized guidelines are based on an analysis of the latest scientific evidence, which will help the clinicians and patients make right decisions regarding H. Pylori infection treatment management. Using clinical practice guidelines for the diagnosis, treatment, and prevention of H. Pylori infection, as well as educational sites for the HCPs and patients, such as the *American College of Gastroenterology (ACG)*, *National Institute for Health and Clinical Excellence (NICE)*, *American Gastroenterological Association (AGA)*, *Scottish Intercollegiate Guidelines Network (SIGN)* and *Center of Disease Control and Prevention (CDC)* are essential (Hunt et al., 2011).

The World Health Organization recently underscored the need to eradicate H. Pylori infection in order to prevent gastric cancer (Hunt et al., 2011). According to Hunt and colleagues (2011), nearly all-gastric cancer cases (95%) results from H. Pylori infection. H. Pylori infection also causes more than 90% of gastric MALT lymphoma cases. Eradication of H. Pylori infection has been shown to induce remission in approximately 80% of patients with early-stage gastric MALT lymphoma (Hunt et al., 2011). A lack of protocol guidance has led to delayed treatment and unnecessary cost in care such as repeated visits and referrals to specialists (Gikas et al., 2014). Furthermore, to provide an alternative and usable resource, such as protocol tool, which will increase the HCPs' knowledge before and during patient's care is important.

A review of the literature revealed that guidelines help clinicians formulate decisions efficiently and consistently (Pronovost, 2013). Using guidelines increases the efficiency of patient cares, eases delivery of high-quality care based on the evidence, and finally, improves patients' health

outcomes (Stollman & Graham, 2014). Other studies suggested that clinical guidelines might improve patient care by providing openly accessible information regarding the best care (Patel & Dunn, 2015). Guidelines and research studies stress the importance of professional judgment of the providers. In addition, there is a need for effective interventions and education in the primary care clinic for H. Pylori infection treatment management (Hunt et al., 2011; Patel & Dunn, 2015; Stollman & Graham, 2014). The first goal is to identify patients with the infection before they develop atrophic gastritis because eradication of the bacterial infection reduces the risk of peptic ulcer disease, gastric cancer, and other related diseases (Stollman and Graham, 2014).

The choices of the test depend on the availability, cost, and distinction between criteria used to establish a diagnosis of the infection. Other important factors are clinical presentation, the population prevalence of H. Pylori infection, differences in tests performances, and factors that may influences the test results, such as the use of Proton Pump Inhibitors (PPI)/histamine receptor antagonists (H2RA) and antibiotics treatment before the H. Pylori test (Hunt et al., 2011). According to Stollman and Graham (2014) patients who are undergoing a breath test, stool antigen test, or endoscopy should be free from medication with PPIs or H2RAs for a minimum of two weeks and antibiotics for four weeks prior to test for H. Pylori infection. These medications may cause a false negative result if the patient is taking prior to the test.

The challenge remains regarding which patients should be tested and treated if positive for H. Pylori infection. According to ACG all patients with active ulcer disease (UD) should be tested for H. Pylori infection, as well as patients with a history of UD who are currently receiving maintenance ant-secretory therapy (PPI and H2RA) unless previous cure of H. Pylori infection has been documented) should be tested for HP infection (Chey et al., 2017; Hunt et al., 2011). In addition, patients with gastric MALT lymphoma and patients who are aware and

concerned about the risks of H. Pylori infection should be tested and treated for H. Pylori. Furthermore, patients with unexplained iron deficiency anemia and adults with idiopathic thrombocytopenic should be tested and treated if positive (Hunt et al., 2011).

The patient who had a history of endoscopic resection of early gastric cancer should be reassured and treated if positive, but only after being given complete information, including the potential side effects associated with current eradication therapies. Therefore, patients with new-onset or persist dyspepsia who have no red flag symptoms such as chronic GI bleeding, dysphagia, progressive unintentional weight loss, chronic iron deficiency anemia, persistent vomiting should be tested (Chey et al., 2017; Hunt et al., 2011; Patel & Dunn, 2015). In addition, patients with new-onset dyspepsia who have red flag symptoms should have an upper endoscopy. If the result is negative, the patient's ulcer should be treated in a standard fashion such as PPI or H2RA (Patel & Dunn, 2015). Still, the causes of the ulcer disease should be considered and evaluated further (Hunt et al., 2011; Patel &Dunn, 2015; Stollman and Graham, 2014). For patients with new-onset dyspepsia, guidelines recommended that lifestyle modification should be encouraged first, such as healthy eating, reducing weight, and smoking cessation. Therefore, avoiding alcohol, coffee, chocolate, and fatty foods, elevating the head of the bed 30-45 degrees, and having a meal before going to bed may help some people (Hunt et al., 2011).

The purpose of the H. Pylori infection treatment is to cure ulcers disease and to reduce the risk of gastric cancer, while the burden of gastric cancer is increasing. The H. Pylori infection eradication treatment is supported by numerous consensus groups around the world and is generally safe and well tolerated (Hunt et al., 2011). The H. Pylori standard treatment is based on multidrug regimens. The first-line treatment is triple therapy: such as Amoxicillin 1 GM BID,

Clarithromycin 500 MG BID, and Proton Pump Inhibitor (PPI) 20- 30 MG BID. In addition, if Penicillin allergies occur alternatively Metronidazole 400 MG BID can be used, and the total duration of the treatment is 14 days (Chey et al., 2007; Fallone et al., 2016; Hunt et al., 2011; Patel & Dunn, 2015; Stollman & Graham, 2014). Second-line treatment is quadruple therapy: this treatment should be used after first-line treatment failure or if the patient has previously had clarithromycin. The second alternative treatment is Amoxicillin 1gm BID, Levofloxacin 250 mg BID, and PPI 20-30 mg BID for 14 days. The PPI may need to be continued once a day for four weeks post-treatment, or until ulcers heal (Chey et al., 2007; Fallone et al., 2016; Hunt et al., 2011; Patel & Dunn, 2015; Stollman & Graham, 2014). Antibiotic resistance is the main factor in the failure of eradication therapy and recurrence of H. Pylori infection. An individual with H. pylori that has not responded to second-line treatment therapy should be referral to a gastroenterologist ((Hunt et al., 2011; Patel & Dunn, 2015).

There are many studies involving the assessment, treatment, and prevention of H. Pylori infection management, but remarkably few focused on patient compliance and success of treatment. The patient's commitment is required for three or four different drugs to be taken in combination twice to four times a day for up to 14 days. HCPs whose ethnic backgrounds differ from that of patients are frequently unaware of patients' communication barriers, which can make treatment compliance more difficult. Somali patients are concerned more about symptoms rather than illness because symptoms often represented the disease and when symptoms are resolved, they often stop taking treatment. They also compare their medications and share with each other (Pavlish et al., 2010). Time should be taken to counsel patients and explaining that successful eradication depends on full compliance with the treatment. Furthermore, HCPs should always explain to the patient that medications' side effects such as metallic taste, nausea,

and diarrhea are common when taking complicated drug therapies such as triple or quadruple therapy. Six to eight weeks follow-up appointment to recheck if the H. Pylori infection was cured would also improve compliance and outcome.

All patients should be retested at least four weeks after the end of antibiotic treatment. The urea breath test (UBT) or a stool antigen test should be used to retest patients, or biopsy-based tests can also be used. In addition, the PPI should also be stopped at least two weeks, and antibiotics at least four weeks before H. Pylori infection testing is carried out. Patients who have received two courses of different antibiotic treatment and still remain H. Pylori infection positive by stool antigen or urea breath test should be referred to Gastroenterology (Chey et al., 2007; Stollman & Graham, 2014). Patients of any age who present with the following red flag symptoms: chronic GI bleeding, dysphagia, progressive unintentional weight loss, chronic iron deficiency anemia, persistent vomiting or patient aged 55 years or older with persistent dyspepsia should be a referral to a specialist (Patel & Dunn, 2015).

Theoretical Framework

Changing one's practices can be difficult, and it is almost impossible if there is not a clear process toward change or if there are knowledge gaps. In order to change providers' attitudes and reduce the immigrant population's health disparities, system change is needed. Fortunately, there are various change theories available that can provide a guiding framework for the planning and implementation of this DNP project. The two change theories that are specifically congruent to this DNP project are the Culturally Competent Model of Care by Dr. Josepha Campinha-Bacote (2002) and Lewin's Change Theory (1951). These theories can be utilized to design an educational program that promotes the ability of healthcare providers (HCPs) to meet the needs of diverse patients more efficiently and to improve their quality of care. Utilizing the

combination of these two change theories in this QI educational intervention will influence HCPs in the process of developing cultural awareness and management of HP infection strategies.

The first change theory that was utilized to enhance the overall effectiveness of this educational resource is Lewin's Change Theory (1951). This theory can be utilized to design an educational program that promotes the ability of HCPs to meet the needs of H. Pylori infected patients more efficiently and to improve their quality of care. This theory forces a person to replace prior learning with new ideas and is based on three components that include *unfreezing, change, and refreezing* (Lewin, 1951). The organization goes through these three change stages before the change becomes permanent. The *unfreezing* step is where the organization prepares for change (Lewin, 1951). The focus of this phase is raising awareness of the problem and recognizing that change is needed. In this stage, the DNP student and clinic quality improvement team discussed and identified the need to change regarding the HCPs' knowledge deficit of best practice for H. Pylori infection management.

Once the idea of change has been accepted, the second stage, which Lewin calls "*change*", will follow (Lewin, 1951). The change stage included the planning and implementation of the DNP project. This stage's first step is to identify gaps, and to develop pre- and post-intervention questionnaires. These questionnaires/surveys evaluate the level of providers' knowledge and what change they made to their daily patients' care maintenance. Chart reviews are done to assess guideline adherence. The final stage is *refreezing* or establishing the new way of doing as the standard operating procedure (Lewin, 1951). This stage involves keeping the newly identified methods in place and transferring them into practice. This theory provides a guidance framework that facilitates organizational change and improvement of patients' health outcomes (Batras et al., 2014). Utilizing Lewin's change theory in this QI

educational intervention enhanced the process of developing a management tool for H. Pylori infection strategies.

Dr. Campinha-Bacote's Culturally Competent Model includes *cultural awareness, knowledge, skill, encounters, and desire*, which involve knowing about other peoples' culture, health values, beliefs, disease patterns, and existing health disparities, as well as to become engaged in the process of cultural competence (Campinha-Bacote, 2002). Campinha-Bacote's model of cultural care provided the foundation of this DNP project to help improve providers' knowledge regarding *cultural awareness* of how Somali cultural practices influence H. Pylori infection transmission. Incorporating culturally congruent care leads to mutual understanding, respect, appreciation, and better adherence to the care regimen and reduction for H. Pylori infection. Discovering knowledge that could be used to provide culturally tailored care that is meaningful, safe, and satisfying to people of diverse cultures is essential (Quappe & Cantatore, 2005). Providers play a critical role in making diverse patients feel safe and welcome in the healthcare setting. In order to change providers' attitudes and reduce the culturally different population's health disparities, cultural sensitivity training is needed (Quappe & Cantatore, 2005).

Project Design and Methods

The aim of this QI project was to develop a culturally competent protocol tool that HCPs at an inner city FQHC in Minneapolis can use for the assessment, treatment, and prevention of the H. Pylori infection in the Somali immigrant population. The target population of this DNP project was HCPs, age 18-years and over who were caring for Somali immigrant patients with H. Pylori infection. The survey questionnaires, as shown in (Appendix A) and educational sections were designed to allow participants the opportunity to learn and to increase their knowledge.

Furthermore, the program was also designed to assess HCP's knowledge regarding current H. Pylori infection guidelines adherence, ability to assess and identify symptomatic patients' use of confirmatory diagnostic labs, and use of appropriate treatment, as well as patients' follow-up after the treatment per protocol (see Appendix B).

The intervention in this DNP project combined both educational resources and cultural competency training to increase HCPs' knowledge and improve patient outcomes. During project design, the DNP student collected two data elements. The first data element was a pre- and a post-survey to evaluate providers' knowledge of the current guidelines pertinent to the H. pylori infection management, as well as Somali culture and disease transmission (see figure 1). The second data element was extracted from a review of ten patients' randomly selected charts to evaluate guideline adherence and how many patients were tested, treated, or referred to a specialist (see Figure 2). Based on the survey results and charts reviewed, the DNP student created a culturally competent tools by designing a PowerPoint presentation and several educational resources including protocol algorithm, as shown *in* (Appendix B) to increases the knowledge and confidence level of the HCPs to manage H. Pylori infection in the Somali immigrant population. Finally, the post-survey results were conducted to evaluate the effectiveness of the H. Pylori infection protocol tool and culturally sensitive educational resources.

Goals/Objectives

The vision of the DNP project was to improve providers' knowledge regarding HP infection assessment, treatment, and prevention, and to create culturally competent educational courses to increase awareness and understanding of the Somali culture. This would lead to better management and intervention of H. Pylori infection reduction. The first goal was to evaluate

providers' knowledge gaps regarding H. Pylori infection management guidelines and Somali culture to identify where the knowledge gaps exist. The second goal was to develop and introduce understandable educational resources such as an evidence-based protocol tool for management of H. Pylori infection specifically designed for Somali immigrant patients, as shown in (Appendix B). The third goal of the DNP project was to implement useable and understandable educational resources as well as to assess the effectiveness of the H. Pylori infection protocol tool and culturally sensitive educational recourses.

The visions of this project include the utilization of pre and post survey tests and the result of the patients' chart review to measure: *"How well do Health Care Providers (HCPs) at an inner city Federally Qualified Healthcare Center (FQHC) in Minneapolis adhere to and perceive the usability of a protocol designed for the assessment, treatment, and prevention of H. Pylori infection in the Somali immigrant population?"* and *How does HCPs' knowledge of H. Pylori infection treatment change after and educational intervention?"*

Project Implementation

The clinic has eight total HCPs who are caring for all ages. Participants included three male physicians and five female nurse practitioners; ages ranged between 29 and 60 years. Prior to the implementation of the project, all HCPs working at the site were informed and received an in-person orientation to the nature of the topic. Participations were voluntary, and arrangements for the project implementation was made during providers' meeting times, all HCPs agreed to participate in this project. Those who expressed interest received an invitation to participate in the project, followed by the informed consent document.

A total of eight HCPs were recruited for this QI project. Pre-survey questionnaires were then sent to assess HCP knowledge two weeks before the educational intervention. The participants were invited to raise questions or concerns before the educational intervention

began. They were also informed that the project's educational sessions would take 1 to 2 hours and arrangements were made for follow-up questions if clarifications were needed. A post-intervention questionnaire was also sent to the HCP two weeks after the educational intervention to assess if their knowledge increased after the educational intervention. In addition, the participants were reminded that they could withdraw at any time during the QI project. Those who signed a consent form and agreed to participate received an educational review of current H. Pylori infection clinical guideline recommendations for assessment, treatment, and prevention, as well as a brief explanation of how Somali culture can correlate with disease transmission. All these HCPs were pre-assessed, educated, and then re-assessed on their knowledge and awareness of current H. Pylori infection guidelines usability in the FQHC clinic, as well as what they know about the correlation between Somali culture and disease transmission.

The presentation was conducted during regular clinic hours and clinical director scheduled the presentation during lunch and adjusted all the staff's schedules to accommodate this. In addition, the quality improvement team supported the project implementation and arranged all HCPs' schedules to accommodate their participation in the project. The educational resources were presented to the target population during the pilot program. The interventions were introduced twice to reach all the clinic providers and to expose the material to the most HCPs. The most significant factors noted by the DNP student were the readiness and eagerness of the HCPs, and other staff. Even though only eight HCPs participated in pre- and post-surveys, there were thirteen people who participated in the educational intervention the first time. Five out of thirteen participants were nurses and medical assistants.

Many of the staff requested education and were eager to have it once the protocol tool was presented and given to the HCPs, nurses, and medical assistants. The second time, a total of 22 people participated. The educational intervention took place from October 30, 2017, to February 28, 2018, in 1 to 2 hours of PowerPoint presentation, with the discussion of the project and expected outcomes. In addition, the providers were given four different handouts designed by the DNP student. The handouts were based on a H. Pylori infection management protocol tool algorithm which includes understanding Somali culture and disease transmission, an appropriate diagnosis tool, treatments, and post-treatment follow up for verification of the treatment effectiveness. The primary stakeholders were committed to the idea of the project, and supported the DNP student throughout the implementation of the QI project by giving the HCPs four educational handouts during the time the DNP student was not available. Please see stakeholder's agreement letter in (Appendix C).

The DNP student explained throughout the instruction how utilizing the guidelines in practice could limit poor outcomes in patients with H. Pylori infection. HCPs were educated on the practice of the H. Pylori infection guidelines and were introduced into the protocol tool algorithm that they can use for the H. Pylori infection assessment, treatment, and prevention. Also to identify any red flags such as chronic GI bleeding, dysphagia, progressive unintentional weight loss, chronic iron deficiency anemia, persistent vomiting, or patients age 55 years or older with persistent dyspepsia (Patel & Dunn, 2015). HCPs were then asked to utilize the protocol tool algorithm and adhere to the practice. During the intervention, the DNP student provided ongoing support to the HCPs regarding H. Pylori infection management options, answered questions or gave more information such as treatment, post-treatment follow up, and education about how cultural behaviors correlated to increased disease transmission. The project was

successfully implemented into the organization to change the way HCPs treat H. Pylori infected patients.

Project Results/ Evaluations

The DNP student presented the educational intervention to the target population. This process involved six steps: conducting a gap analysis, completing HCP pre-surveys to evaluate their pre intervention knowledge regarding H. Pylori infection management and cultural awareness; completing a chart review to evaluate guideline adherence and how many patients were tested, treated, or referred to a specialist; providing background education; completing post-intervention surveys to evaluate the effectiveness of the intervention; and determining the usefulness of the theories that guided this QI project. An educational offering allowed the opportunity for the HCPs to learn about a variety of options for managing H. Pylori infection in the primary care setting. HCPs at the FQHC received several educational resources, which can be utilized for the H. Pylori assessment, treatment options, and prevention management.

Providers' educational training resulted in more exceptional care in the primary care setting. The overall success of the project was determined by comparing HCPs pre and post survey tests (See Figure 1), collecting pre/post chart review (See Figure 2) and analyzing these data results to determine if HCPs' knowledge and utilization of the current H. Pylori infection treatment management guidelines increased. Analyzing these data allowed the DNP student to determine if the goal of increasing HCPs' knowledge of the H. Pylori infection assessment, treatment, and prevention was achieved. Additional tests including EKG and confirming that the patient was not taking PPI in the two weeks or antibiotics in last four weeks prior to H. Pylori test, which may cause false negative test.

Providers' Survey Questionnaires Data Analysis

The first survey questionnaires were used to identify current HCPs' knowledge and practices regarding H. Pylori infection guidelines usability and barriers to managing patients with different cultural backgrounds. The second survey questionnaires were to assess if the providers' knowledge increased after post education and protocol tool implementation. These mixed methods approach enhanced the exploration of this QI project's question: *“How well do Health Care Providers (HCPs) at an inner city Federally Qualified Healthcare Center in Minneapolis adhere to and perceive the usability of a protocol designed for the assessment, treatment, and prevention of H. Pylori infection in the Somali immigrant population?”* and *“How does HCPs' knowledge of H. Pylori infection treatment change after an educational intervention?”*

In all, eight HCPs completed the pre- and post-educational survey. The results were evaluated to identify whether the number of participants who correctly answered each question increased between pre and post-interventional assessments. In the pre and post-interventional survey, eight out of eight (100%) of the respondents responded to the question correctly on “which test do you prefer to diagnose for H. Pylori infection”. Additionally, six out of eight (75%) correctly answered the question on “What is the route of transmission for H. Pylori infection” before intervention and eight out of eight (100%) answered correctly after the educational intervention.

In response to the questions: “If the patient is positive with H. Pylori infection, are you concerned about the patient's family members or close friends if they infected with H. Pylori infection?” If yes: do you test them?” One out of eight (12.5%) said that he/she was aware of disease transmission and considered testing and treating family members/close friends all the

time before the educational intervention. Two out of eight (25%) responded, only if they are symptomatic before the educational intervention. After exposure to the intervention, eight out of eight (100%) reported that they would test and treat family members/close friends to prevent disease transmission and the reinfections process. One out of eight (12.5%) respondents correctly answered the question, “When you are treating H. Pylori infection, are you aware of whether the patient's culture can influence H. Pylori infection transmission, If yes how do you prevent infection transmission?” None of the providers answered this question correctly before the educational intervention compared to eight out of eight (100%) answered this question correctly after the intervention. Eight out of eight stated that they would educate the patient and family members about how to prevent infection transmission.

Two out of eight (25%) providers strongly agreed that they were aware of H. Pylori infection guidelines and correctly answered the question, “When you are treating H. Pylori infection, do you use H. Pylori guidelines? If yes, which guidelines do you use?” Two out of eight (25%) of the providers were using “guidelines” and were able to cite *American College of Gastroenterology* (ACG) as a reference. While the other six out of eight (75%) were using “*Up-To-Date*” as an Internet-based reference before the educational intervention, compared to eight out of eight (100%) reported using guidelines from the “*American College of Gastroenterology, National Institute for Health and Clinical Excellence (NICE), American Gastroenterological Association (AGA) after the intervention.*” While *Up-To-Date* is accepted in the medical community as a valid reference, it is technically a tool to access rather than a treatment guideline (Shekelle, Aronson & Melin, 2016).

Even though the review of the patients’ charts showed that two out of eight (25%) providers gave the patient inadequate treatment, eight out of eight (100%) of respondents

correctly answered the question: “How long do you treat H. Pylori infection?” Before and after the educational intervention, they all agreed “that the duration of the treatment should be” 14 days with triple therapy, such as Amoxicillin 1Gm BID x 14 days, Clarithromycin 500 mg BID x 14 days and Proton pump Inhibitors (PPI) 20-30 mg BID x 14 days.

All the HCPs had mixed answers to the question: “Do you conduct follow-up testing after treating H. Pylori infection? If yes: How long do you wait to retest the patient to rule out H. Pylori infection?” There was only one out of eight (12.5%) who answered this question correctly before the educational intervention. This provider said the follow up is six to eight weeks, and eight out of eight (100%) said the follow up is six to eight week after the educational intervention. Seven out of eight (87.5%) of the HCPs answered this question, “What is the most common resource of information you use regarding HP infection?” By using *Up-To-Date* before the educational intervention compared to eight out of eight (100%) HCPs said they use “ACG, NICE and AGA” after the educational intervention. Overall, only one out of eight (12.5%) answered all eight questions correctly before intervention and eight out of eight (100%) after the educational intervention.

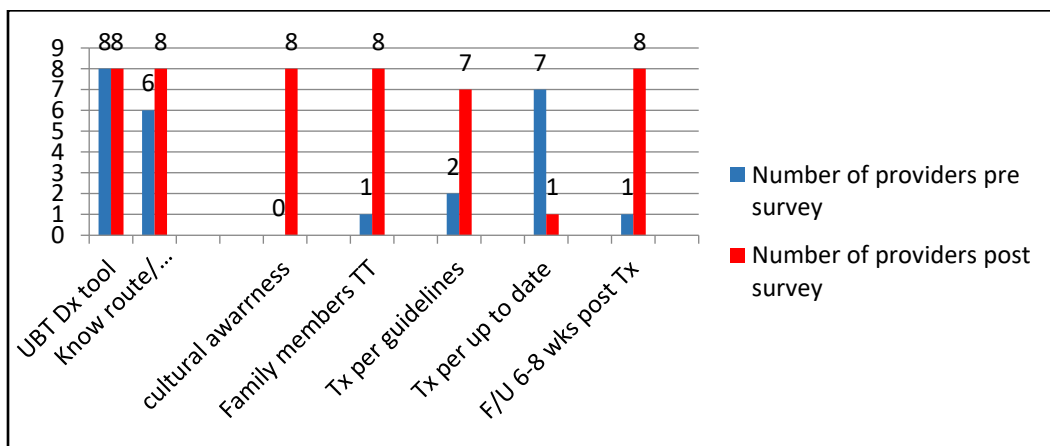


Figure 1. HCPs’ Knowledge assessments and comparison of the HCPs’ pre/post-educational interventions

Data were submitted into a Microsoft Excel spreadsheet for the data management and analysis. Basic descriptive statistics were used to evaluate the results of the pre/post surveys, which completed during program implementation. The overall success of the project was determined by comparing pre and post survey tests and chart review result data to determine if the HCPs' knowledge and utilization of the H. Pylori infection treatment management guidelines and cultural competent care increased. The present results supported the primary outcome of post-intervention knowledge of HCPs, which showed that a brief educational intervention could improve HCPs' knowledge of when and how to use appropriate treatment for patients with H. Pylori infection. The brief educational interventions were associated with remarkable changes in HCPs' knowledge and practice.

Patients' Charts Review Data Analysis

A review of patient charts prior to the educational intervention showed that ten Somali patients who were symptomatic with H. Pylori infection tested positive for H. Pylori in four weeks. Based on providers' understanding of the clinical symptoms and presentation of H. Pylori infection, the providers identified ten potential cases. Two out of ten patients initially correctly identified did not carry through with treatment, and upon follow-up were again detected by the providers based on clinical presentations, and offered treatment. This means there was twelve clinical encounters patients as Intent to Treat (ITT).

All twelve ITT cases were offered urea breath test lab (UBT) to confirm or rule out H. Pylori infection per protocol, and all twelve ITT patients accepted and completed labs tests. Twelve ITT patients were confirmed as positive for H. Pylori infection. Three out of twelve were given appropriate treatment and one additional patient was treated, but the treatment was inadequate. Only one out of twelve ITT patients were appropriately followed for six to eight

weeks per protocol and one patient was brought back for a follow-up at three months. In addition, approximately one-third of the identified ITT patients received appropriate treatment, and only one of the patients were brought back for a follow-up at six to eight weeks.

The goal was to identify if educational intervention increases providers' knowledge to narrow the gap between current practice and treatment guidelines. According to the post-educational intervention, based on providers' understanding of the clinical symptoms, and presentation of H. Pylori infection, the providers identified ten potential cases. Those ten patients were tested, and eight of them were diagnosed positive with H. Pylori infection as ITT. Seven out of eight patients were given appropriate treatment, and post-treatment follow-up at six to eight weeks per protocol to confirm if the infection was cured. In addition, one patient did not return for treatment and is considered lost to follow-up. The two cases were referred to the lab, but they had a negative test result and it was suggested that the providers were sensitive to the clinical presentation of H. Pylori infection. Furthermore, there was no reluctance from the patients to undergo the tests. There appeared to be no apprehension, cost barriers, or technical barriers to the lab tests.

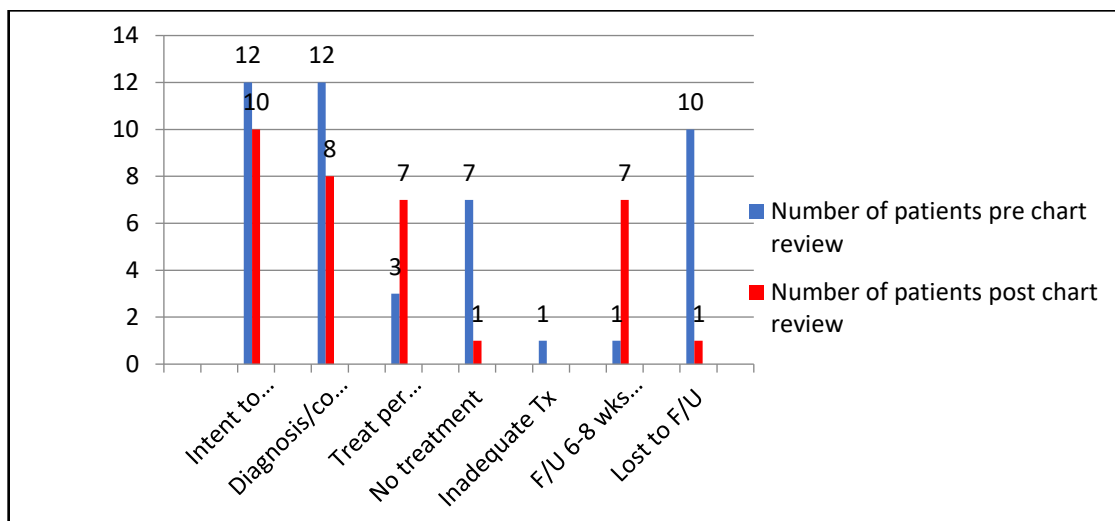


Figure 2. Comparison of the pre- and post-educational interventions patients' charts review

This analysis of the results of the chart review revealed that during the pre HCP educational intervention, less than half of the providers gave the recommended treatment and post-follow-up care to the patients. Such findings highlight the significance of the need for HCPs to understand appropriate methods of treatment and prevention for H. Pylori infection. However, the post-survey chart review demonstrated that the FQHC clinic's HCPs used protocol tool algorithm appropriately and correctly understood how to identify the H. Pylori infection symptom presentation. In addition, pre and post survey chart review revealed that the HCPs were sensitive and correctly identified H. Pylori infection without hesitation and they referred the patients to the lab for appropriate confirming tests.

Discussion

The goal of the educational intervention was to educate HCPs for H. Pylori infection management according to the latest guidelines. The results of the project underlined the importance of educating HCPs on the use of H. Pylori infection clinical practice guidelines and the utilization of the protocol tool algorithm, which showed the positive impact of the H. Pylori infection assessment, treatment, and prevention protocol. The results of the data evaluations revealed that Culturally Competent Model of Care by Dr. Josepha Campinha-Bacote (2002) and Lewin's Change Theory (1951) were supportive strategies to promote the development and implementation of HCPs educational tool.

After the educational intervention, HCPs adhered to the H. Pylori infection guidelines and used the algorithm. According to HCPs, educational intervention, data revealed that adherence to treatment guidelines increased from 25% to 87.5% and cultural awareness increased from 0% to 100% after post educational intervention. One of the providers stated, "the program gave me a great sense of cultural awareness to help me better serve my patients"

Furthermore, the data analyzed showed a positive correlation between educating HCPs on the H. Pylori infection guidelines, guidelines adherence, and culturally competent care, which will limit poor health outcomes for patients with H. Pylori infection.

The DNP project implementation was successful, and the educational sessions generated a lot of discussion about the importance of the topic. Some of the providers discussed the importance of treating patients without testing H. Pylori infection, due to frequent patient complaints that they cannot be off PPI in two weeks, while others were against this idea because the antibiotic overuse is very dangerous, which may contribute to the development of antibiotic-resistant bacteria. In addition, the feedback from the presentation, which occurred during the initial project, allowed for the adaptation of the content for inclusion in the protocol tool. These adjustments included clarification of H. Pylori infection assessment, treatment, and prevention.

The DNP Student completed a pilot project and revealed that most HCPs felt they did not receive enough learning resources regarding H. Pylori infection management, and they wished for more educational resources. Seven out of eight providers “strongly agreed” and one “agreed” that the PowerPoint was useful and would be beneficial to practice. All eight HCPs reported that the PowerPoint was brief, clear, and detailed; other staff stated that it provided valuable information. Overall feedback from the HCPs on the educational session was positive. They expressed that it would be beneficial if educational resources continued such as adding HCPs’ educational in services. In addition, the HCPs have committed to the use of the protocol tool as a sustainable educational and staff in-service education.

Strengths/Barriers

The DNP student assessed the project potential barriers and strengths during the educational intervention. There were three major barriers to this implementation project:

changing HCPs' previous practice, lack of time due to providers' busy schedules, and small participant sample. This DNP student hoped to overcome the difficulty of changing HCPs' usual practice because it is the provider's decision whether to follow the guidelines and manage H. Pylori infection per protocol. Breaking the current treatment habits of HCPs can be difficult. After the project HCPs are utilizing guideline and appropriately managing patient with H. Pylori infection.

The other barrier of this project included the small participant sample. Even though there was 100% HCPs participation, this is a small practice site with few providers, which may affect the result. There were more staff participants in the educational sessions than physician/nurse practitioner providers. However, the information is still critical for the staff to understand and be able to initiate discussion with the provider on these issues. Furthermore, the sample size may limit the ability to determine the result of this project. Additionally, the time for the intervention (four weeks) was a short amount of time for providers to use the educational resources; they may not have had enough patients with H. Pylori infection during that time. More time for the use and practice of the educational resources may help to improve self-perceived confidence levels.

All the HCPs completed the pre and post survey tests, which allowed the DNP student to determine if the goal of increasing HCPs' knowledge level and confidence in managing H. Pylori infection was achieved. Finally, the post-survey result showed that the HCPs' knowledge of the H. Pylori infection management improved and outcomes for the quality improvement project were all met.

The potential strengths included HCPs believed that the H. Pylori infection protocol tool algorithm and knowledge of H. Pylori infection guidelines were beneficial. The HCPs also desired improvement and utilization of current practice guidelines of H. Pylori infection

management in this primary care clinic. Comments were elicited from participants to evaluate the presentation. Most comments were positive and highlighted the importance of providing educational intervention related to managing H. Pylori infection. The comments demonstrated the helpfulness of the handouts. Seven out of eight providers strongly agreed that the PowerPoint was useful and would be beneficial to practice, while one out of eight providers agreed. All eight providers reported that the PowerPoint was brief, clear, and detailed; other staff stated that it provided valuable information.

Ethics

The aim of this DNP project was to develop a protocol tool that health care providers can use for the assessment, treatment, and prevention of the H. Pylori infection in the Somali immigrant population. This QI project was an educational intervention that did not involve human subject's research or patient contact. The target population was HCPs who were caring for Somali immigrant patients. The survey questionnaires and educational sessions such as algorithm were designed to allow participants the opportunity to learn and to increase their knowledge. This project was submitted to the St. Catherine University IRB and deemed to be a QI project.

The training included health care providers participating in a pre- and post-survey on H. Pylori infection management and an educational intervention consisting of a PowerPoint presentation given by the DNP student. The possible risks of this QI project were minimal because this project was an educational intervention that did not involve patients' contact information or experimental treatment. In addition, the potential benefits outweigh the possible risks in this QI project. Furthermore, the information gathered was kept confidential in a locked cabinet in the DNP student's office. Confidentiality was maintained at all stages of the project,

and HCPs who completed the pre and post surveys were asked not to write their name on their completed surveys.

The HCP educational intervention was designed to reflect the constructs of Lewin's (1951) change theory and Campinha-Bacote's (2002) cultural competence model, which provide an understanding of the processes HCPs experience as they increased their knowledge how to manage H. pylori infection in the Somali population and gain cultural awareness. Culturally appropriate care is an ethical issue because lack of cultural knowledge leads to inadequate care. Cultural appropriate educational intervention involves other peoples' culture, their health values, and beliefs as well as their disease patterns and existing health disparities. There was a significant need to increase providers' knowledge regarding diverse cultures and how their patients' cultural behaviors might influence the risk of a disease process. The evidence appears to support that a theoretical framework can be used to guide the delivery of culturally competent care, which is essential to improve patient's quality of life and decrease health disparities in Somali immigrant populations.

Significance for Interdisciplinary Collaboration

The clinical setting for this QI project serves the majority of the Somali residents living in the urban area. The clinic is a nonprofit community clinic founded in 2007. This organization is a FQHC, which operates under the authority of the Health Resources and Services Administration (HRSA). HRSA is the federal agency for improving health care for people who are geographically isolated and economically or medically vulnerable. The clinic's goals and values are to improve the health of the community they serve and to provide optimum health care while addressing patients' physical, emotional, and spiritual needs, as well as those of their families. Clinic management and the quality improvement team, who place a high value on

evidence-based practice, had no hesitation for the implementation of the DNP project, as show in because they knew that it would improve patient outcomes and provide an example of improved care. The nurse practitioners and physicians expressed a desire to give appropriate care for the patients with HP infection after the educational intervention. The HCPs and office manager have shown commitment to this DNP project. Please see stakeholder's agreement letter in (Appendix C).

Suggestions for Future Direction

HCPs play a significant role in the care of their patients, so educating HCPs is an essential element of successful patient care management. In other words, there are enough guidelines for H. Pylori infection testing and treatment, and HCPs must understand and follow these guidelines. There was a limited educational intervention regarding H. Pylori infection management in the primary care setting. Offering educational resources can decrease the demand for H. Pylori infection management in the primary care setting. Several studies have shown that an educational intervention, which highlights the need to not only provide education but also to provide a culturally competent educational intervention, is needed (Beach et al., 2005). Another study also illustrated that more intense and multi-layered knowledge translation activities for HCPs are more likely to be effective (Majumdar et al., 2005).

To provide quality and adequate health care services for Somali patients, it is essential that providers are knowledgeable and comfortable in not only providing the treatment, but also being aware of the cultural behaviors that influence disease transmission. The effect of this project was not only to improve H. Pylori infection management but it also opened the discussion to create more education for primary care providers regarding patients' education for H. Pylori infection, medication adherence, and side effects, as well as disease prevention.

The results from this QI project were shared with the HCPs. Based on results, the DNP student, and HCPs recommended continued educational intervention to increase HCPs knowledge and confidence level related to the management of the H. Pylori infection in the primary care setting. All HCPs used the protocol tool algorithm and found that utilizing the guidelines was not a waste of time as they thought before. The providers also mentioned that having the protocol tool algorithm posted in each exam room would be very helpful for quick reference. The comments were positive, and the recommendation was to use this protocol tool after the post-project implementation. In addition, the above suggestions with cultural awareness of disease prevention and H. Pylori infection management will likely bring greater results. This particular theme will help and support future implications for extending QI initiatives based on this topic.

Conclusion

This QI project can be achieved as the foundation for future exploration into helping expand standards of care for H. Pylori infection management and to improve HCPs' adherence to H. Pylori infection guidelines practice. This project also provided meaningful evidence and vision into possible changes that should be considered to increase provider knowledge of the H. Pylori infection assessment, treatment, and prevention methods, as well as culturally appropriate care. Protecting immigrant populations with a high incidence of H. Pylori infection and high occurrence of gastric cancer is important. The HCPs should use evidence-based practices to support the patient's plan of care because if HCPs close the practice gaps associated with possible barriers, the patient's quality of life will improve.

Additional interventional strategies, such as protocol tools are needed to prevent and manage H. Pylori infection in this immigrant population. Failure of appropriate treatment,

inadequate education, and lack of patient- provider communication increase the recurrence and transmission of the H. Pylori infection (Ahmed et al., 2009). The providers in this QI project addressed H. Pylori infection issues and other associated symptoms during regular patient visits. To manage H. Pylori infection, it is vital for the providers to understand and be knowledgeable of various manifestations of H. Pylori infection. Patients with H. Pylori infection may experience serious complications such as gastric cancer if care is not managed appropriately.

Education is effective in shaping clinical practice. Although HCPs were able to correctly identify patients who have H. Pylori infection and missed diagnosis a couple of times, the education was designed to increase the sensitivity such that even when patients did not present with all symptoms the providers defaulted to H. pylori as a clinical possibility. Furthermore, the lack of culturally competent care may negatively impact the patient's quality of life and contribute to existing health disparities. This DNP project supports Somali populations' positive health outcomes and disease prevention.

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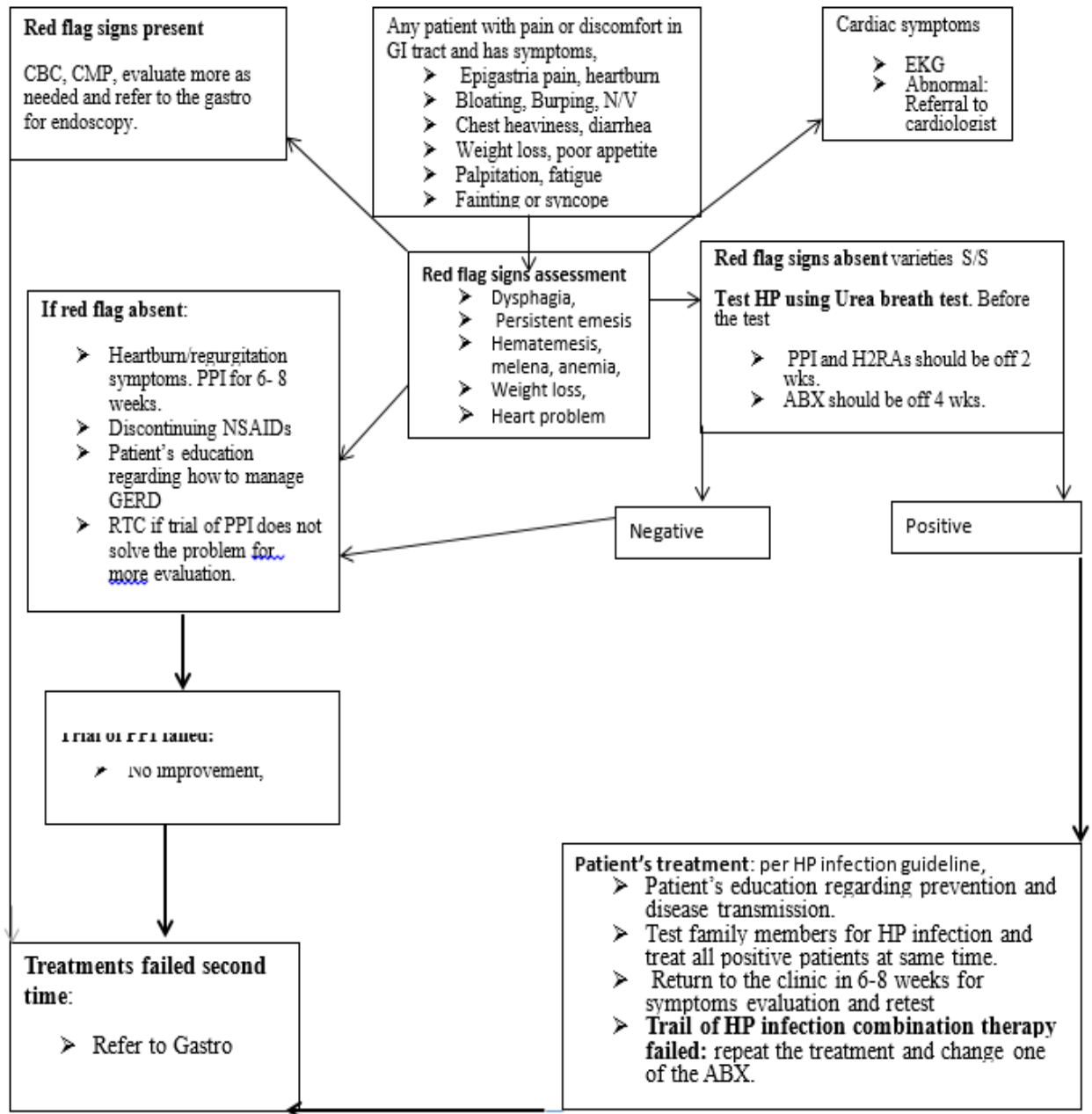
Appendix A

Survey Questionnaires for Providers

- 1) Which test do you prefer to diagnose for Helicobacter pylori (H. Pylori) infection?
- 2) What is the route of transmission for H. Pylori infection?
- 3) If the patient is positive with H. Pylori infection, are you concerned about the patient's family members or close friends if they infected with H. Pylori infection? If yes, do you test them?
- 4) When you are treating H. Pylori infection, are you aware of whether the patient's culture can influence HP infection transmission? If yes how do you prevent infection transmission?
- 5) When you are treating H. Pylori infection, do you use H. Pylori guidelines? If yes, which guidelines do you use?
- 6) How long do you treat H. Pylori infection?
- 7) Do you conduct follow-up testing after treating H. Pylori infection? How long do you wait to retest the patient to rule out H. Pylori infection?
- 8) What is the most common resource of information you use regarding H. Pylori infection?

Appendix B

H. Pylori Infection Assessment and Treatment Algorithm



Appendix C
Key Stakeholder Agreement



July 21, 2017

Institutional Review Board
St. Catherine College

AXIS Medical Center
1801 Nicollet Ave S.
Minneapolis, Mn 55082

RE: Letter of Support for Ms. Zahra Roble, NP's H. Pylori Project

To the Institutional Review Board,
AXIS Medical Center is pleased to support Ms. Zahra Roble and Helicobacter Pylori Infection Management Project.

Ms. Roble is a cherished member of the AXIS Medical Center provider staff and demonstrates a genuine curiosity and determination to get to the source of disease, as well as to develop resources and tools to treat patients. As a researcher Zahra unquestionably will conduct herself and her research with the interests of the patients first, never compromise patient safety, and faithfully follow the protocol as approved.

AXIS Medical Center has a number of patients who present with H. Pylori, and Ms. Roble's project undoubtedly will help AXIS, an Federally Qualified Healthcare Center (FQHC) and Essential Community Provider (ECP) for better understand the disease state, and to implement Ms. Roble's findings to improve the quality of care.

As an Epidemiologist and Clinical Director, it is an undiluted pleasure to support Ms. Roble in this H. Pylori project. AXIS Medical Center will make patients available; will allow Ms. Roble to screen and offer Informed Consent per the Code of Federal Regulations, will ensure that there is are private meeting rooms dedicated for the conduct of the study, and a locked storage cabinet to store the data. In short, AXIS Medical Center pledges to support Ms. Roble with the time and resources necessary to make this project a success.

Please do not hesitate to contact me if you have any questions or concerns.

Kindly,


Jonathan K. James, MS, MPH, PhD

Epidemiologist and Clinical Director
AXIS Medical Center