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Barriers to Colorectal Cancer Screening within a Rural Community in Ohio

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DNP Final Project Report

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Dedication

Without a doubt, this capstone project is dedicated to my husband Michael. His support and motivation throughout this entire process proved to be the most important foundation for my degree. He always acted as my number one supporter and never doubted that I would finally graduate one day. This is also for my mom who provided encouragement and emphasized the importance of higher education since day one. She inspired me to become the nurse I am today and will continue to provide inspiration in my role as a nurse practitioner.

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Many speed bumps were presented along the way, including moving to a completely different state, but thanks to all of the faculty, staff, and my classmates at the University of Kentucky College of Nursing, I was able to achieve my dream of becoming a DNP. Thank you again to all of those who helped me along the way because each of you will forever impact my future as a nurse practitioner.

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Abstract

Purpose: The purpose of this study was to perform a needs assessment within the primary care practice of ProMedica Family Medicine in Fostoria, OH. The needs assessment will specifically identify intentions and behaviors, attitudes and beliefs, subjective norms about behavioral control, and healthcare provider or healthcare system barriers related to colorectal cancer screening.

Methods: This was a cross-sectional study using a survey among a convenience sample of patients who were 50 - 75 years of age and were not currently up-to-date with their colorectal cancer screening. In total, 222 patients were screened, 133 patients were determined to not be up-to-date, and 75 surveys were completed. Survey administration took place between January and February 2017.

Results: A distinct barrier to screening was not identified. Those with a lower education showed an increased fear of the screening process ($p = 0.018$) and an increased fear of cancer diagnosis ($p = 0. 017$). Fifty-four percent of surveys returned reported adequate knowledge about colorectal cancer screening and disease process; however, participants tended to disagree when asked about intention to get screened.

Conclusion: Further research is needed to identify methods to increase colorectal cancer screening intentions.

Barriers to Colorectal Cancer Screening within a Rural Community in Ohio

Introduction

Colorectal cancer (CRC) remains the second leading cause of cancer-related deaths and the third most prevalent form of cancer among men and women in the U.S. (Centers for Disease Control and Prevention, 2014). In 2012 alone, 134,784 Americans were diagnosed with CRC and 51,516 died from this preventable disease (CDC, 2014). The most effective method of preventing CRC continues to remain within the process of screening. Screening allows providers to identify at-risk individuals with precancerous polyps that can then be removed before progressing to cancer.

Although multiple screening methods exist, rates of screening continue to remain below the recommended rate of 70.5% of adults for Healthy People 2020 (Healthy People 2020, 2014). The current percentage of adults screened for CRC remains at 52.1% in the U.S. To determine why these rates might be so low, it is important to examine barriers related to this degree of noncompliance.

As a means of identifying barriers, a needs assessment was performed within the office of ProMedica Family Medicine in Fostoria, OH. This allowed the practice to identify potential barriers that led to decreased screening rates within their community. All individuals who were 50-75 and were not up-to-date with CRC screening were presented a survey upon arrival for their scheduled healthcare appointment. The survey obtained patient demographic information and assessed barriers to screening and patient knowledge about colorectal cancer screening guidelines (see Figure 1). The long-term goal of this program was to increase CRC screening through the identification of particular barriers encompassing this population subset. In order for this to happen, the health care providers of ProMedica Family Medicine could use the

information obtained within this study to tailor their individualized CRC screening approach in hopes of overcoming these barriers unique to their population.

Background

Colorectal cancer can be a devastating disease, but is entirely preventable with the recommended screening (American Cancer Society, 2010). This study was performed in Fostoria, OH, which is located in a tri-county area and consists of Hancock, Seneca, and Wood County. The practice, itself, resides in Hancock County. The community of Fostoria is comprised of about 13,167 individuals with 78% being Caucasian, 6% African-American, and 11% Hispanic (U.S. Census Bureau, 2015). The average annual household income is $34,708 with 29% living at or below the poverty level. In Hancock County between 2008-2012, there were 38 new diagnoses of CRC, with 16 deaths (Ohio Department of Health, 2015). From these cases diagnosed in Hancock County, 53.1% were late stage diagnoses.

The American Cancer Society currently recommends CRC screening to begin at age 50 and continue to age 75 with no known risk factors (American Cancer Society, 2016). Screening to detect polyps can include a flexible sigmoidoscopy every 5 years, colonoscopy every 10 years, double-contrast barium enema every 5 years, or a CT colonography every 5 years. Other screening tests include a guaiac-based fecal occult blood test (FOBT) every year, a fecal immunochemical test every year, or a stool DNA test every 3 years. Of course all screening methods have various price points and levels of invasiveness, but preventing CRC before it becomes aggressive can come at a huge cost savings. For example, costs of CRC treatment can range from $36,395 for a stage 1 diagnosis to $62,845 for terminal stages. In fact, in 2010, CRC related costs accounted for $14.14 billion dollars (American Cancer Society, 2014).

There appears to be a gap between distribution of CRC screening guideline recommendations and patient-specific guideline adherence. To investigate this gap, barriers that prevent screening were investigated; more specifically, the CRC screening barriers within the population at ProMedica Family Medicine in Fostoria, OH. Determining the barriers specific to this population will allow providers and the practice to tailor their approach to CRC screening in order to overcome the outlined obstacles. The available tests for screening are being offered in this population on a daily basis, but if the patient refuses to take part in the recommendations for practice, then the provider cannot force adherence on the patient. It then becomes necessary to identify why these patients are refusing to take part in CRC screening or what patients view as the barriers to screening

After review of the available literature, many themes emerged surrounding barriers to CRC screening within a wide-variety of population subsets. Studies reviewed included rural areas in Kentucky and Georgia and large healthcare systems in Virginia, New Mexico, and Massachusetts. The studies discussed the perceived patient and provider barriers of CRC screening as well as the demographic variables that impact screening adherence. Common themes that emerged in all the readings included behaviors, beliefs or attitudes, subjective norms, and healthcare provider or system related barriers. (Hoffman, Rhyne, Helitzer, Stone, Sussman, Bruggeman, Viera, & Warner, 2011; Jones, Devers, Kuzel, & Woolf, 2010; Knight, Kanotra, Siameh, Jones, Thompson, & Thomas-Cox, 2015; Lasser, Ayanian, Fletcher, & DelVecchio Good, 2008; Wilkins, Gillies, Harbuck, Garren, Looney, & Schade, 2012).

Barriers related to behaviors focused on perceived priority of screening, intent to get screened, and lack of regular preventative care services (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). Providers felt that patients did not

perceive screening to be a priority. Patients, on the other hand, felt that screening required too much time, their schedules did not allow time to participate in screening, or they had thought about being screened, but had never followed through with the action of screening (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012).

Beliefs or attitudes regarding screening encompass a vast amount of the examined barriers as well. Fear is the primary barrier within this subset and was found to include fear of screening and the tests involved, pain, sedation, complications of screening, cancer diagnosis, and fatalistic views (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). Along with the associated fear, many felt that screening was not necessary. This was often attributed to lack of associated symptoms of CRC, no family or personal history of CRC, and no knowledge regarding the benefits of screening. Similar to the individual beliefs, perceived social norms often serve as a significant barrier to screening. Lack of social support for screening and social norms surrounding the actual screening procedures were also found to impact individual screening behaviors (Hoffman et al., 2011; Jones et al., 2010; Lasser et al., 2008).

Healthcare providers and healthcare systems were also included as substantial barriers towards CRC screening. Many individuals reported a lack of recommendation or emphasis on the importance of screening (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). If their providers did not force the issue or personalize the argument, then the patient was less likely to seek screening. Individuals also described a lack of knowledge about screening options, prevalence rates of CRC, and the associated benefits and harms, as negative factors impacting their screening status. Providers often did not force the issue because they felt counseling was difficult, office visits did not allow enough time, and the

level of difficulty associated with scheduling and results follow-up (Hoffman et al., 2011). Individuals reported system barriers to include the cost of screening, accessibility to screening, and the overall screening process (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Wilkins et al., 2011). These barriers were present in rural and suburban areas, indicating accessibility to screening options can occur in any population.

In order to determine characteristics of the participants and their level of screening adherence, demographic variables were collected in all studies reviewed (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). Common findings included lower screening adherence among males compared to females and in African-Americans or other minorities when compared to Caucasians. Individuals in lower socioeconomic classes and fewer years of formal education also reported less compliance with CRC screening. This may be associated with a larger uninsured population.

Given that CRC screening can prevent CRC and reduce associated costs it is imperative that CRC screening be addressed in primary care clinics like ProMedica Family Medicine. Identification of barriers similar to those described within the literature will help to tailor screening efforts towards the population in question. Hence the goals of this project were attainable and feasible in the identified setting.

Purpose

The objectives for the screening program were:

Between January and February 2017, a needs assessment was performed that examined the barriers impacting non-adherence to colorectal cancer screening among adults 50-75 years of age who were not up-to-date with CRC screening and are patients in the office of

ProMedica Family Medicine in Fostoria, OH. The needs assessment specifically examined:

- A. Intentions and behaviors related to CRC screening
- B. Attitudes and beliefs about CRC screening
- C. Subjective norms about behavioral control
- D. Healthcare provider or healthcare system barriers to CRC screening

This project sought to achieve detection of barriers to colorectal cancer screening unique to the selected population in order to identify some of the largest obstacles hindering compliance with the recommendations for CRC screening.

Methods

Setting

The study took place in Fostoria, OH at the primary care practice of ProMedica Family Medicine. The practice is under the direction of ProMedica Healthcare based in Toledo, OH. ProMedica Healthcare offers health care services to residents across 27 counties in northwest Ohio and southeast Michigan and is comprised of a network of hospitals, physicians, health care professionals, researchers, and specialty clinics and facilities (ProMedica, 2016). The primary mission of all of ProMedica's entities is to improve the health and well-being of its community. The primary care practice of ProMedica Family Medicine focuses on improving the health of the local residents in Fostoria, OH and its rural surrounding communities. Within the practice of ProMedica Family Medicine, three doctors of osteopathy and four nurse practitioners provide primary care to a population consisting of individuals whose ages range from newborns to geriatrics. As a whole, this practice sees approximately 2,000 patients/month each year. This patient population is made up of approximately 88% Caucasian, 5% African-American, and 6%

Hispanic. Of the 2,000 patients seen each month by the practice, 30% fall within the 50-75 age range to be examined in the study.

Design

This study employed a cross-sectional study design using a survey among a convenience sample of patients at ProMedica Family Medicine. A survey was administered to gain information deemed helpful to understand knowledge, attitudes, behaviors and barriers toward colorectal cancer screening.

Sample

Adults 50-75 years old who attended ProMedica Family Medicine within a 2-month period between January and February 2017 were selected for participation in the study. Participants were included if they fell within the specified age range and were not currently up-to-date with CRC screening. Individuals were excluded from participation if they were <50 or >75 years of age and if they were up-to-date with CRC screening or had a diagnosis of colon cancer or colon polyps. Up-to-date screening included a FIT/FOBT within the past year, stool DNA testing within the past 3 years, flexible sigmoidoscopy within the past 5 years, colonoscopy within the past 10 years, double-contrast barium enema within the past 5 years, or a CT colonography within the past 5 years. Non-English speaking participants were also excluded. A participation size of 100 individuals was predicted; the actual sample size was 75. ProMedica Family Medicine sees about 2,000 patients each month and it was predicted that 48% of adults in the U.S. who were 50-75 were not up-to-date with CRC screening (Healthy People 2020, 2014). Based on these numbers, it was assumed that 40% of relevant adults at ProMedica Family Medicine were not up-to-date. The actual percentage of those not up-to-date was obtained by reviewing patients scheduled during the study. Over the course of the study, 222 charts of

people between the ages of 50 and 75 were reviewed. Of these 222, 133 charts were determined to be not up-date with their CRC screening and were therefore eligible to participate in the study. This equates to 60% of the population reviewed, far from the goal of Healthy People 2020, which recommended a screening goal of 70.5% (Healthy People 2020, 2014). From the eligible participants, 75 individuals partially or fully completed the barriers survey. This illustrates the rate of return to be 56%.

Procedure

Upon receiving approval from the Institutional Review Boards at University of Kentucky and ProMedica Healthcare, the population of interest was chosen from the office of ProMedica Family Medicine. To identify potential participants for the program, a daily chart review, using electronic medical records, was performed to identify patients that met the criteria to participate in the study. The PI performed the chart reviews and administered surveys 1-2 times each week during the course of the study. Potential participants who met the predetermined criteria were selected from the prescheduled patients. The potential participants were then invited to participate in a survey regarding CRC screening. The recruitment of participants occurred during the check-in process. The survey was performed with paper and pen or pencil.

Measures

To guide attitudes, behaviors and barrier identification, the Theory of Planned Behavior (TPB) was used to examine the multiple dimensions involved in barrier identification. This framework identified what beliefs led to behaviors (Ajzen, 2006). These beliefs can be classified into four different categories and include intentions about a behavior, attitudes about a behavior, subjective norms about a behavior, and perceived behavioral control. Details about these specific measures are as follows:

1) Intentions about a behavior illustrate how likely an individual is to perform a behavior.
2) Attitudes about a behavior can include favorable and unfavorable beliefs. For assessment of attitudes regarding CRC screening, the participant was evaluated for their attitudes about how harmful or beneficial, good or bad, worthless or useful, and pleasant or unpleasant they viewed screening to be.
3) Subjective norms often describe the associated peer pressure believed to be related to the behavior in question. This was determined by evaluating the influence an individual believes peers and family have on their decision-making.
4) Perceived behavioral control assesses the belief about taking part in CRC screening.

By using the TPB, one can conclude that an individual is more likely to engage in a specified behavior if attitudes and subjective norms about the behavior are higher, therefore leading to more perceived behavioral control (Ajzen, 2006). For example, if participants averaged higher scores on the various considerations, then one would expect the participants to be more likely to seek CRC screening.

In addition, specific barriers to screening for CRC were assessed by examining two different classifications. Based on the literature reviewed, barriers were summarized into one of two categories, provider or system related barriers and patient barriers. By examining the specific barriers that may impede patients to seek CRC, the cause of screening non-adherence can be more accurately pinpointed. The details of these barriers are as follows:

1) Provider and system barriers assessed included failure to recommend screening, lack of education regarding screening, cost of screening, limited or no access to screening, and availability of screening resources in the community.

2) Patient related barriers included fear of pain or embarrassment related to CRC screening, fear of cancer diagnosis, shame of being sick, mistrust of healthcare and doctors, lack of symptoms, and lack of knowledge related to CRC screening

Finally, demographic variables included age, education level, race/ethnicity, sex, marital status, and insurance. Demographic variables help to determine how these factors impact intentions, attitudes, social norms, and perceived behavioral control. The demographic variables also included the participant's personal screening history and their personal and family history of CRC. Screening history allowed for comparison of documented screening history in the individual's medical record versus the reported screening history by the participant in the study. Assessing the family and personal history of CRC helps to determine the level of risk associated with developing colorectal cancer in the future. Using the details listed above, this survey was designed by the PI in its entirety and can be viewed in Figure 1.

Analysis

The objectives for the needs assessment included identification of the intentions and behaviors, attitudes and beliefs, subjective norms about behavioral control, and healthcare provider and healthcare system barriers to CRC screening. In order to review the results obtained, the following methods were utilized. The descriptive analysis included means and standard deviations (SD) for the continuous variables and frequencies with percentages for categorical and ordinal variables. Means with standard deviations were used to describe Section C: Intentions, Attitudes, Social Norms, and Perceived Behavioral Control related to CRC screening, as well as age. Lower scores represented a lower endorsement of the components and stronger barriers against CRC screening for most questions. A few of the components to assess attitude regarding screening assessed opinions with lower scores representing a higher

endorsement and vice versa. It was predicted that greater attitudes, subjective norms, and perceived behavior control, led to a positive association with intention of getting and staying up-to-date with CRC screening. The demographic data collected helped to identify what subsets of the population were influencing CRC screening barriers and attitudes, subjective norms, perceived behavioral control, and intentions. These variables were evaluated by using frequencies with percentages, with the exception of age, which was evaluated by obtaining a mean with standard deviation. Frequencies were also applied to provider and system and patient barriers by equating "yes" with the number one and "no" with the number two.

In order to determine the impact of demographic variables, continuous variables, such as age, were compared to barriers using *t*-tests. For categorical variables, such as insurance and education, Pearson's chi-square test for independent samples was used to compare demographics to barriers. For cells with less than five, the Fisher's exact test was used. To compare categorical variables to Section C, the one-way ANOVA with post-hoc analysis was incorporated. When comparing only gender to Section C, an independent sample t-test was necessary. In order to compare continuous variables to Section C, Pearson's correlation coefficient was used. Data analysis was conducted using SPSS version 24. To determine statistical significance throughout, a level of 0.05 was used.

Results

Sample Characteristics

From the completed surveys the mean age was 61, with 25% falling in the 50-55 age range, 24% were 56-60, 24% were 61-65, 15% were 66-70, and 12% were 71-75. Results showed the study population included 48% males and 52% females. The racial disparities were less than assumed with 91% white and only 9% African-American or Hispanic (see Table 1).

As discussed previously, the poverty rate in Fostoria is fairly high and this was reflected in our survey data as well. Patients with Medicaid accounted for 20% of our population, 28% had Medicare, 10% used a combination of Medicaid and Medicare, and 30% had private insurance. Participants were also asked about their employment status and level of education. Of those surveyed, 25% reported working a full-time job, 8% worked part-time, 25% were retired, 27% were unemployed, and 15% reported disability or some other form of income. The majority of the population reported having a high school diploma or GED at 52%, 19% reported less than a high school education, 20% reported some college or trade school, and only 9% reported a college degree or higher.

All potential participants were reviewed for their CRC screening history using the electronic medical records prior to being asked to participate. Many of the participants may have been screened for CRC in the past, but were not currently compliant with guideline recommendations. Forty-five percent of participants reported a history of CRC screening. Of those individuals, 18% reported completing a stool sample and 88% reported a colonoscopy in the past. It was also important to investigate how many individuals had a family history of CRC or colon polyps. Surprisingly, 22% of participants had a family history of CRC and only 15% had a family history of colon polyps. Of those who identified a family history of CRC, 33% listed their mother as positive for CRC.

Intentions and Behaviors

Each survey also assessed the likelihood that each patient would take part in CRC screening within the next six months and what were the driving factors behind this decision. These questions were derived using the Theory of Planned Behavior (Azjen, 2006). In total, there were fifteen Likert scale questions, ranging 1 to 7. The table of these results can be found

under Table 3. The participant's intention to take part in screening was evaluated by asking about their plan or desire to take part in screening over the next six months. The Likert scale ranged from a 1 indicating strongly disagrees and a 7 indicating strongly agrees. The mean for each of the three questions fell around a 3 with a SD of 2. This indicates that participants were less likely to take part in future screening within the next six months.

Attitudes and Beliefs

Assessment of patient barriers helped to determine how an individual's beliefs could be used to determine barriers against CRC screening. This was performed using yes or no style questions. Six questions were asked to determine common patient barriers, but only five of the six were positive if the patient answered "yes". The sixth question asked about adequate patient knowledge regarding screening options. Of those who completed the survey, 39% did not answer "yes" to any patient barrier questions, 23% answered "yes" once, 16% answered yes to two or three questions, 5% answered "yes" to four questions, and only 1% answered "yes" to all five questions. The most common patient barrier reported dealt with reported pain or embarrassment of the screening process, with 32% reporting "yes" to this aspect. Thirty percent shared a general lack of trust in the health care system and 29% felt that if they had no symptoms of CRC, then screening wasn't necessary. When asked if the patient felt like they had adequate knowledge about CRC and CRC screening options, an overwhelming 54% reported "yes". A summary of patient report barriers can be found in Table 2.

To determine attitude about screening, four questions were asked and a 7-point Likert scale was used to assess these questions (see Table 3). The first questions asked how harmful or beneficial the patient perceived screening to be; the mean for this was 5.1 with a SD of 1.9. This indicates the participants perceive screening to be more beneficial than harmful. The second

question asked about how good or bad screening was; the mean was 3.84 with a SD of 2.12. This score represents an indifference towards the likeability of CRC screening. The third question asked how pleasant or unpleasant the patient felt CRC screening to be; the mean was 4.27 with a SD of 2.14. This question, again, represents an indifference to the likeability of CRC screening. The fourth question surrounding attitude asked how worthless or useful screening was perceived to be; the mean was 4.86 with a SD of 1.9. This question indicates that participants perceived screening to be more useful than worthless.

Subjective Norms about Behavioral Control

Subjective norms was the next aspect assessed using the survey; scores ranged from 1 indicating strongly disagrees to a 7, which indicated strongly agrees. The patients were asked if they felt others wanted them to take part in screening and whether they were under peer pressure to be screened. The means for these four questions ranged from 2.83 with a SD of 2.03 to a mean of 4.13 with a SD of 2.25. This generally indicates that most participants felt that they were not under any sort of peer pressure to take part in CRC screening.

The final category under this section dealt with perceived behavior control. Again, participants ranked their feelings from 1 to 7, with 1 indicating they strongly disagree and 7 indicating they strongly agree. The participants were asked about their confidence level regarding CRC screening, with a mean score of 4.39 and SD of 2.3. These scores indicate that they have more confidence to take part in screening. Participants were also asked if they felt the process of screening was difficult or easy; the mean was 3.92 and the SD was 2.05. This indicates that participants perceive screening to neither be easy or hard. The patients were also asked if they felt like the decision to take part in screening was beyond their control; the mean was 3.03 and the SD 2.2, thus illustrating that screening was more in their control than not. The

final question asked if they felt like the decision to take part in screening was up to them; the mean was 5.98 with a SD of 1.78. Indicating that they strongly agree with the question and the decision to take part in screening was their choice.

Healthcare Provider and System Barriers

Survey participants were also asked questions regarding provider and system, these can be found in Table 2. There were a total of eight questions regarding provider and system barriers. If the patient answered "yes" to any of these questions, then the question was positive for a provider or system barrier. In total, 24% did not answer "yes" to any, 19% answered "yes" to one or two questions, 16% answered "yes" to three questions, 9% answered "yes" to four questions, 7% answered "yes" to five questions, 4% answered "yes" to six questions, and only 1% answered "yes" to seven or eight questions. The most commonly reported barriers in the category were a reported lack of transportation or lack of time, which was more centered on system barriers. Thirty-two percent participants reported that their provider never recommended CRC screening.

Significant Correlations

Based on the information presented above, there is little evidence to prove that provider and system barriers or patient barriers are the sole reason for poor CRC screening compliance in the survey population in Fostoria, OH. In order to help identify significant correlations from the data collected, statistician Amanda Wiggins helped to perform data analysis in the SPSS software.

From those surveyed, approximately 30% reported never receiving a recommendation from their provider or not receiving an adequate amount of education from their provider. Although 30% is a fair amount of the population, it remains less than half of those surveyed.

The only group found to have a significant relationship with provider education were those with Medicare and another form of insurance ($p = 0.03$). Individuals that had Medicare and another form of insurance reported that 83% had not received education on CRC screening from their provider. For those with Medicare, alone, only 37% reported never receiving CRC screening education. No significant correlations were found between provider recommendations for screening and any demographic variable.

The only statistically significant relationship found within demographic variables and patient barriers was between the cost of screening and patients who have Medicare combined with another form of insurance ($p = 0.02$). Of the participants who carry Medicare with another form of insurance, 80% reported that screening for CRC was too expensive. Only 22% of those who carry Medicare alone reported that screening was too expensive. Both are nominal, compared to only 10% of those with private insurance who reported CRC as too expensive.

A positive correlation was found between level of education and pain or embarrassment associated with screening ($p = 0.018$). Sixty-four percent of participants who held less than a high school diploma reported concern over the pain and embarrassment associated with CRC screening. Of the females surveyed, 44% reported a problem with the pain or embarrassment associated with CRC screening ($p = 0.011$). Correlations found within patient barriers included the worry about the possibility of a cancer diagnosis and level of education ($p = 0.017$). Of individuals with less than a high school diploma, 57% were concerned about the possibility of cancer diagnosis. Forty-five percent of unemployed individuals were reportedly concerned about the shame associated with being sick ($p = 0.008$). Only 12.5% of those employed full-time share the same concern.

When asked about adequate present knowledge surrounding CRC screening, retirees reported the largest percent of adequate present knowledge at 78%, ($p = 0.037$), with the unemployed a close second at 60%. Similarly, as age increased, so did the percentage of individuals who answered "yes" to adequate present knowledge ($p = 0.022$). One could assume that many in the retired group also fell into the higher age groups meaning these categories may have had many of the same people in them.

No significant difference was found when comparing personal history and family history to barriers and the questions within Section 3. Demographic variables were also compared to Section 3 to determine if any statistically significant relationships existed. Question C12 was found to have an inverse relationship with age ($p = 0.009$). As age increased, the individual's confidence in taking part in CRC screening decreased. Question C13 was also shared a statistically significant relationship with relationship status ($p = 0.018$). Question C13 evaluated the level of difficulty compared to the ease of screening. Individuals who reported their relationship as married, single, or divorced tended to have a mean score that was less than those who were widowed. No other significant relationships were found.

Discussion

Based on current literature regarding barriers to CRC screening, it was predicted that lower levels of screening would be seen among males, non-whites, lower socioeconomic classes, and individuals with lower levels of education (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). Most of these assumptions can be carried through to the current study, but there were almost equal parts male and female who were not up-to-date, which is not similar to current research. The population screened did encompass a larger

percent that were unemployed, individuals who used Medicaid or Medicare, and individuals with a high school diploma or less.

Another common finding found in the literature with similar findings in this study involved patient time and access to screening. Of those screened, 45% reported not having enough time to get screened, but 52% of those screened reported being unemployed or being retired. One usually associates an unemployed or retired lifestyle to have more free time than their counterparts who are employed. Further information is needed to determine what is occupying their time and making them feel as if they do not have the time to participate in collection of a stool sample or if necessary, a colonoscopy. Forty-two percent of those screened also reported a lack of transportation and 32% reported a lack of available community resources, thus illustrating further similarities to available literature. This barrier also indicates a need for teaching; 54% of those with Medicaid and 40% of those with Medicaid and Medicare indicated they don't have access to transportation. Most Medicaid within the state of Ohio offers free transportation to and from health care appointments, procedures and other medical testing (Centers for Medicare and Medicaid Services, 2016).

Literature also reported a major barrier to be cost; however, in this study only 25% reported CRC to be too expensive and 32% reported inadequate insurance. Those with Medicare and some other form of insurance reported the most problem with the cost of screening. From this, it can again be assumed that further education is necessary for this population. Medicare covers the cost of FIT or FOBT for CRC screening yearly and colonoscopies for screening purposes every 10 years (Medicare, 2017). Therefore, these individuals should not have a problem with the cost of screening if they were appropriately educated on their insurance benefits.

Another of the most common barriers found within the literature revolved around fear. People reported fear of screening and fear of cancer diagnosis (Hoffman et al., 2011; Jones et al., 2010; Knight et al., 2015; Lasser et al., 2008; Wilkins et al., 2012). Although fear was a barrier reported in this study, only 32% reported an actual fear of the pain or embarrassment associated with screening and 29% were concerned about the actual diagnosis. As discussed, those with less education than a high school diploma conveyed more fear in these two areas than their counterparts. This could possibly be due to lack of education regarding screening and the disease process. Surprisingly, the unemployed indicated a larger concern with the associated shame of being sick. Those who are unemployed do not have to worry about missing work and the stressors a chronic disease diagnosis often has on an individual's career. Further information is needed to determine why individuals see a cancer diagnosis as shameful.

Other common barriers involved a lack of symptoms of CRC and no family history (Hoffman et al., 2011; Jones et al., 2010; Lasser et al., 2008). Only 54% of those with a positive family history planned to take part in CRC screening within the next 6 months and 29% reported that a lack of symptoms indicated that screening wasn't necessary. Both of these could indicate a knowledge deficit in the CRC disease process and the hereditary nature of CRC. Lack of social support or peer pressure was also shown to impact the likelihood of being screened. In this study, most participants did not feel that it was expected to get screened and they did not feel under peer pressure to get screened. Regardless of their family history, there was no difference in the opinion on peer pressure. The majority did conclude that the decision to get screened was completely up to them.

Regardless of the similarities between the study and the available literature, the individuals who participated in this survey illustrated little intention or desire to take part in CRC

screening within the next six months. The majority had positive feelings about screening, indicating that it was more beneficial than harmful and was more useful than it was worthless, but they continued to hold steadfast in their desire to not be screened.

During survey administration, there was an increase in dialogue about CRC screening between providers and their patients. Many providers reported an increase of questions regarding screening and how the patients could get and stay up-to-date. Several patients who had a frequent history of declining screening willingly left the office with FIT packets to perform CRC screening at home. It is possible that the survey allowed the provider to introduce the topic of CRC screening without appearing too obtrusive and nagging.

Limitations

Several limitations were present throughout the survey administration. The population for the survey used a convenience sample in order to ease participant recruitment. It was projected that 80% of the population would be of Caucasian decent, when in fact, the actual sample size included 91% Caucasian and only 9% Hispanic or African American. This division of ethnicities did not provide an accurate representation of the Fostoria community.

There was a 56% rate of survey return and most individuals who did not return the survey did not state their reason for not participating. Those who did report their reason for not completing the survey often reported that it was too long or they were not interested in taking a survey at this time. The level of education in this population was low with many reporting less than a high school diploma. This could also indicate why the return rate was low. It is possible that many could not read nor interpret the survey correctly and therefore shared no desire in completing the survey. However, the literacy level of the population was not known.

Limited education could also explain why some individuals did not complete the survey in its entirety. Some comments left on the surveys included things like "my difficulty with the questions was in the wording" and "some questions were a bit confusing". In fact, 38% reported having difficulty understanding "a few of the questions", other survey opinions can be found in Table 4. This level of difficulty could have impacted the way the questions were interpreted. Along with level of education, this could also have been due to the way the questions were written. In retrospect, some of the questions could have been worded differently to avoid conveying a double negative meaning. Another common report identified by participants was the length of the survey. Twenty-nine percent reported the survey to be "a bit too long" and 17% reported the survey to be "much too long". This could also explain the rate of return and the rate of incompleteness.

Implications for Practice

Based on the information provided, one would assume that education is where the focus for future research should be; despite 54% of participants reporting that they have plenty of knowledge regarding screening. The survey indicated that neither provider and system barriers nor patient barriers exhibited an overwhelming rationale for the lack of screening in this population. The most concerning finding, however, was the population's unanimous desire to not be screened.

This could be due to lack of accurate education. Of those surveyed, 71% reported that they had received education on CRC screening from their healthcare provider, yet 46% reported inadequate knowledge of CRC and the screening available. Based on this information, one may wonder if this knowledge that these individuals profess to have is accurate or adequate? It is obvious that some deficits in education exist based on the findings from the survey. Many

individuals indicated that they are not aware of the insurance coverage for routine screening, the community programs available, the screening options available, and the risk factors associated with CRC. Further research is needed to determine the best way to provide this education to populations in the primary care setting.

A brief literature search performed after data analysis illustrated the same problems in other communities and rural populations across the United States. Populations where these same issues were found aimed to improve the intentions by increasing education. Wong (2009) reports that education on potential risks associated with cancer was able to significantly influence intent for screening. In another study, efforts to improve screening rates were tackled on a much larger scale. The High Plains Research Network and their Community Advisory Council in Colorado developed an intervention aimed at increasing CRC screening rates and intentions over a multi-county region of Colorado (Westfall, Zittleman, Sutter, Emsermann, Staton, Van Vorst, and Dickinson, 2013). Rural communities teamed up to provide education and awareness of CRC through the communication culture unique to this region. Education was broadcast in local newspapers, local organizations, and through community members. From this intervention, rates of colonoscopies increased 12% over a four-year period (Westfall et al., 2013). Although this study was very extensive, it proves that more research and time is needed to improve screening rates.

Conclusion

As expected, Fostoria, OH, is far from reaching the Health People 2020 goal for colorectal cancer screening. To summarize, barriers within this population included fear of screening and diagnosis, cost of screening, lack of time and resources, lack of education regarding screening and CRC disease process, and limited intentions by the study population to

be screened. Despite the proof that these are common barriers found within the rural population sampled, further research is needed to determine how to improve colorectal cancer screening rates. Even if providers are encouraging screening within their patient population, it is often diffcult to provide this encouragement when the individual has no actual intent or desire to be screened. The most important next step for this population lies in the necessity for further investigation surrounding community-based comprehensive patient education that understands the health literacy of the population. Until this can be achieved, it remains the responsibility of the provider to encourage all preventative screening at each patient encounter.

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Table 1. Descriptive Statistics of the Study Sample (N = 75)

County of Residence	*Percentage*
Hancock	20%
Seneca	60%
Wood	12%
Other	8%
Age	Mean – 61.38 Std. dev – 7.13
50-55	25%
56-60	24%
61-65	24%
66-70	15%
71-75	12%
Gender	
Male	48%
Female	52%
Race	
White	91%
Other	9%
Insurance	
Medicaid	20%
Medicare	28%
Medicare and Medicaid	10%
Medicare and other	8%
Private	30%
Disability	4%
Employment status	
Full-time	25%
Part-time	8%
Unemployed	27%
Retired	25%
Other	15%
Marital Status	
Married/partnered	63%
Divorced/single	29%
Widowed	8%

Level of Education	
Less than high school	19%
High School/GED	52%
Some college	20%
College graduate degree or higher	9%
CRC Screening	
Perceived history of CRC Screening	Yes – 45% No - 55%
CRC screening method (for those who answered yes)	Stool sample – 18% Colonoscopy – 88%
Family history of CRC	Yes – 22% No – 78%
Mother	33%
Father	13%
Brother	7%
Sister	13%
Grandmother	27%
Grandfather	0%
Family history of polyps	Yes – 15% No – 58% Not sure – 27%
Mother	27%
Father	9%
Brother	9%
Sister	9%
Grandmother	9%
Grandfather	0%

Table 2. Barriers to Screening

Provider/System Barriers	*Percentages*
B1: Never recommended by provider	Yes – 32% No – 68%
B2: Not educated on screening	Yes – 29% No – 71%
B3: Too expensive	Yes – 25% No – 75%
B4: No locations available for screening	Yes – 27% No – 73%
B5a: Lack transportation	Yes – 42% No – 58%
B5b: Lack time	Yes – 45% No – 55%
B5c: Lack community programs	Yes – 32% No – 68%
B6: Inadequate insurance	Yes – 39% No – 61%
Provider/System Barrier Totals	Percent of Questions Answered "Yes" (B1 – B6) 0 – 24% 1 – 19% 2 – 19% 3 – 16% 4 – 9% 5 – 7% 6 – 4% 7 – 1% 8 – 1%
Patient Barriers	
B7: Pain or embarrassment of screening	Yes – 32% No – 68%
B8: Worry about possibility of cancer diagnosis	Yes – 26% No – 74
B9: Worry about shame of being sick	Yes – 18% No – 82%
B10: Lack of trust in healthcare system	Yes – 30% No – 70%
B11: No symptoms, screening isn't necessary	Yes – 29% No – 71%
B12: Adequate present knowledge	Yes – 54% No – 46%

Patient Barrier Totals	Percent of Questions Answered "Yes" (B8-B11) 0 – 39% 1 – 23% 2 – 16% 3 – 16% 4 – 5% 5 – 1%

Table 3. Likelihood of Taking Part in Screening in the Future

Intention (within the next 6 months)	1 to 7 (strongly disagree – strongly agree)
C1: Plan to take part in CRC screening	Mean – 3.46 Std. dev – 2.27
C2: Want to take part in CRC screening	Mean – 3.28 Std. dev – 2.45
C3: Will take part in CRC screening	Mean – 3.11 Std. dev – 2.29
Attitude	
C4: Harmful vs. beneficial of CRC screening	Mean – 5.1 Std. dev – 1.87
C5: Good vs. bad of CRC screening	Mean – 3.84 Std. dev – 2.12
C6: Pleasant vs. unpleasant is CRC screening	Mean – 4.27 Std. dev – 2.14
C7: Worthless vs. useful is CRC screening	Mean – 4.86 Std. dev – 1.86
Subjective Norms	1 to 7 (strongly disagree – strongly agree)
C8: People want me to take part in CRC screening	Mean – 3.73 Std dev – 2.34
C9: It's expected	Mean – 3.53 Std. dev – 2.22
C10: Under peer pressure to	Mean – 2.83 Std. dev – 2.03
C11: Peers think its important	Mean – 4.13 Std. dev – 2.25
Perceived Behavior Control	1 to 7 (strongly disagree – strongly agree)
C12: Confident that I can take part	Mean – 4.39 Std. dev – 2.3
C13: The process is difficult vs. easy	Mean – 3.92 Std. dev – 2.05
C14: The decision is beyond my control	Mean – 3.03 Std. dev – 2.2
C15: If I take part is up to me	Mean – 5.98 Std. dev – 1.78

Table 4. Survey Opinion

	Percentages
D1: Length of the survey	Much too long – 17% A bit too long – 29% About right – 54% A bit too short – 0% Much too short – 0%
D2: Difficulty understanding the questions	No – 54% Yes, a few questions – 38% Yes, many of the questions – 8%

Appendix

Barriers to Colorectal Cancer Screening Survey

SECTION A. DEMOGRAPHIC INFORMATION

A1: Which county/city do you live? _____

A2: What is your health insurance status (check all that apply)

OMedicaid OMedicare OPrivate health insurance
O Social security disability ONone

A3: Do you work

OFull-time O Part-time O Unemployed O Student O Volunteer O Other_____(specify)

A4: What year where you born? _____

A5: What is you gender?

O Male O Female

A6: What is the highest grade or year of school you completed?

O Less than high school O High school graduate or GED
O Some college/ vocational/trade school degree O College graduate
O Graduate Degree or higher

A7: What is your ethnicity/race?

O White, non Hispanic O Black, non Hispanic O Hispanic O Asian, Pacific Islander
O Other_____(please specify)

A8: What is your marital status?

O Married, living with spouse O Member of an unmarried couple
O Divorced/separated O Single, never married
O Other_____(please specify)

Have you ever been screened or tested for colon cancer or colorectal cancer?
OYes O No O Not sure

*** Skip A9a and A9b if you answered "NO" or "Not sure" to the previous question**

A9a: If you answered YES to A9, how long ago were you screened for colon or colorectal cancer?
O<1 year ago O 1-3 years ago O 3-5 years ago O 5-10 years ago O >10 years ago
O Not sure

A9b: If you answered YES to A9, what tests did you use (check all that apply)
OStool sample O Colonoscopy O Sigmoidoscopy O Barium Enema
O Not sure O Other_____(specify)

A10: Has anyone in your family (mother, father, brother, sister, aunt, uncle, or grandparents) been diagnosed with colon or colorectal cancer?
OYes O No O Not sure

*** Skip A10a if you answered "NO" or "Not sure" to the previous question**

A10a: If you answered YES to A9, who was diagnosed (check all that apply)?
O Mother O Father O Brother O Sister O Grandmother
O Grandfather O Aunt O Uncle O Not sure

A11: Has anyone in your family (mother, father, brother, sister, aunt, uncle, or grandparents) been diagnosed with colon polyps or had colon polyps removed?
OYes O No O Not sure

*** <u>Skip A11a if you answered "NO" or "Not sure" to the previous question</u>**

A11a: If you answered YES to A9, who was diagnosed (check all that apply)?
O Mother O Father O Brother O Sister O Grandmother
O Grandfather O Aunt O Uncle O Not sure

Section B: Perceived Barriers to Colorectal Cancer Screening

In this section, we are interested in knowing reasons impacting your decision to get screened for colon cancer

Answer the following questions Yes or No

B1: Your primary care provider has never recommended that you should be screened for colon cancer.
O Yes O No

B2: You feel like you have not been adequately educated on colon cancer screening.
O Yes O No

B3: You think it is too expensive to get screened for colon cancer or you do not want to pay for it.
O Yes O No

B4: You do not have access to locations that allow you to be screened for colon cancer.
O Yes O No

B5: You do not have access to the resources that allow you to be screened for colon cancer, answer yes or no to each resource.

a. Transportation O Yes O No

b. Time O Yes O No

c. Community programs that offer screening O Yes O No

d. Other _____

B6: You do not have insurance that will cover colon cancer screening at a reasonable cost.
O Yes O No

B7: You are worried about the pain or the embarrassment associated with colon cancer screening.
O Yes O No

B8: You are worried about the possibility of a diagnosis of colon cancer.
O Yes O No

B9: You are worried about the shame associated with being sick if diagnosed with cancer.
O Yes O No

B10: You do not have trust in the healthcare system.
O Yes O No

B11: You do not have symptoms of colon cancer and therefore do not feel you need to be screened.
O Yes O No

B12: You do feel like you have enough knowledge about colon cancer and the screening available.
O Yes O No

SECTION C. Intentions, Attitudes, Social Norms and Perceived Behavioral Control

(Azjen, 2006)

We would like to know some of your thoughts about colon cancer screening and the likelihood of taking part in colon cancer screening in the future

On a scale of 1 to 7 with 1 being 'strongly disagree' and 7 being 'strongly agree,' indicate to what extent you agree or disagree with the following questions:

	INTENTION	**1**	2	**3**	4	**5**	**6**	**7**
C1.	You plan to take part in colon cancer screening in the next six months	O	O	O	O	O	O	O
C2.	You want to take part in colon cancer screening in the next six months	O	O	O	O	O	O	O
C3	You will take part in colon cancer screening in the next six months	O	O	O	O	O	O	O

	ATTITUDE	**1**	2	**3**	4	**5**	**6**	**7**
C4.	On a scale of 1 being **'harmful'** and 7 being **'beneficial'** how would you rate taking part in colon cancer screening	O	O	O	O	O	O	O
C5.	On a scale of 1 being '**good**' and 7 being '**bad**' how would you rate taking part colon cancer screening	O	O	O	O	O	O	O
C6.	On a scale of 1 being '**pleasant for you**' and 7 being '**unpleasant for you**' how would you rate taking part in colon cancer screening	O	O	O	O	O	O	O
C7.	On a scale of 1 being '**worthless**' and 7 being '**useful**' how would you rate taking part in colon cancer screening	O	O	O	O	O	O	O

	SUBJECTIVE NORMS	**1**	2	**3**	4	**5**	**6**	**7**
	On a scale of 1 being **'strongly disagree'** and 7 being **'strongly agree'** please respond to the following questions:							
C8.	People who are important to me want me to take part in colon cancer screening	O	O	O	O	O	O	O
C9.	It is expected of me that I take part in colon cancer screening	O	O	O	O	O	O	O
C10	I feel under social pressure to take part in colon cancer screening	O	O	O	O	O	O	O
C11.	Most of my peers think it is important to take part in colon cancer screening	O	O	O	O	O	O	O

	PERCEIVED BEHAVIOR CONTROL	**1**	2	**3**	4	**5**	**6**	**7**
C12.	On a scale of 1 being **'strongly disagree'** and 7 being **'strongly agree'** please rate your response to the following statement: **'I am confident that I can take part colon cancer screening'**	O	O	O	O	O	O	O
C13.	On a scale of 1 being '**easy**' and 7 being '**difficult**' please rate your response to the following statement: **'The process of screening for colon cancer screening is….'**	O	O	O	O	O	O	O
C14.	On a scale of 1 being **'strongly disagree'** and 7 being **'strongly agree'** please rate your response to the following statement: **'The decision to take part in colon cancer screening is beyond my control'**	O	O	O	O	O	O	O
C15.	On a scale of 1 being **'strongly disagree'** and 7 being **'strongly agree'** please rate your response to the following statement: **'Whether I take part in colon cancer screening is completely up to me'**	O	O	O	O	O	O	O

D1: How did you find the length of this questionnaire?

- O Much too long
- O A bit too long
- O About right
- O A bit too short
- O Much too short

D2: Did you have difficulty understanding any of the questions?

- O No, I understood all the questions
- O Yes, I had difficulty understanding a few questions
- O Yes, I had difficulty understanding many of the questions

Do you have any comments about this survey. Are there any topics you think should have been included or excluded, or was there anything you liked or did not like about the survey.