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Barriers to Colorectal Cancer Screening in Adults: An Integrative Review

Julie Sanger

jlandsteiner07@winona.edu

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BARRIERS TO COLORECTAL CANCER SCREENING IN ADULTS:
AN INTEGRATIVE LITERATURE REVIEW

A Scholarly Inquiry Paper
Submitted to the Faculty
of the Department of Nursing
College of Nursing and Health Sciences
of Winona State University

by
Julie M. Sanger

In Partial Fulfillment of the Requirements
for the Degree of
Master of Science

June 29, 2020



COMPLETED SCHOLARLY INQUIRY PAPER APPROVAL FORM

TO: Julie Ponto, PhD, APRN, CNS, AGCNS-BC, AOCNS®
Professor and Acting Director, Graduate Programs in Nursing

FROM: Julie Sanger

RE: FACULTY ENDORSEMENT and FINAL REVIEW COMMITTEE

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SCHOLARLY INQUIRY PAPER COMMITTEE:

Chairperson Signature: SJDavies

Susan Davies, PhD, RN

Member Signature:

Diane Forsyth, PhD, RN

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Julie M. Sanger

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ABSTRACT

Colorectal Cancer (CRC) is the third leading cause of death among American men and women. Colorectal cancer is a preventable cancer, with CRC screening recommended from the age of 50. The percentage of people who complete the recommended CRC screening is low. Individuals throughout the United States (US) are rarely offered the opportunity to discuss screening options with their provider and may never complete CRC screening due to multiple barriers. The purpose of this scholarly integrative review is to explore the reasons individuals are not completing CRC screening, including those related to different US populations, and discuss interventions that can be implemented to increase CRC screening rates.

A total of 17 articles, published during the period 2010-2020 were identified using five different databases, internet searches, and secondary references, and were included in an integrated review of literature. Themes were identified and analyzed using a theme matrix. Three main themes were discovered in relation to barriers to CRC screening: patient, system, and provider-related barriers. Many of the identified barriers related to CRC screening are interrelated and complex.

The Health Belief Model (HBM) was the theoretical framework used to understand why individuals may not participate in CRC screening. The HBM is used to predict if individuals will adhere to screening recommendations depending on their perceived susceptibility to CRC, perceived severity of the condition, and whether perceived barriers are high. If perceived benefits are greater than perceived barriers, confidence in completing CRC screening will be higher.

A multicomponent intervention is discussed, including a protocol for a nurse-led visit that was developed to identify a gap in patient education to address the individual barriers that were

identified from the literature review. A framework was identified to evaluate the organization's metrics and population barriers to assist in implementation of the multicomponent interventions. The strategies included were: assessing the infrastructure, interventions identified by the organization, process measures and quantifiable metrics, CRC screening phases, performance, outcome, and cost measures. The goal of implementing interventions is to increase the percentage of individuals who complete CRC screening. These recommendations will be most beneficial to populations with health disparities due to low social economic status, decreased health literacy, poor social networks, and being underinsured.

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I. INTRODUCTION

Introduction to the Inquiry

This scholarly paper explores the perceived barriers individuals encounter related to colorectal cancer (CRC) screening. There is strong evidence in the literature that patients who complete CRC screening can decrease the incidence and mortality of CRC. Social inequalities that contribute to cancer disparities need to be understood in order to identify interventions that can affect miscommunication and delivery of substandard care. It is important to understand individuals' barriers to assist health systems in implementing the appropriate interventions needed to meet the needs of the population served. This section provides an introduction to the background and rationale, purpose of the inquiry, question guiding the inquiry, and method used for the inquiry.

Background and Rationale for the Inquiry

For a majority of adults, age is the most significant risk factor for CRC (Bibbins-Domingo et al., 2016). According to the National Colorectal Cancer Roundtable (NCCRT), CRC is the second most frequently diagnosed cancer in the US (NCCRT, 2019). In 2020, approximately 53,200 Americans are expected to die from CRC; 3,640 of them will be younger than age 50 (American Cancer Society (ACS), 2020b). Colorectal cancer is common among both women and men. Approximately 4.4% of women and men will experience a CRC diagnosis at some point in their lifetime (Bachman et al., 2018). The 5-year survival for localized CRC is approximately 90% with appropriate CRC screening (ACS, 2020a). The chance of survival drops below 20% if CRC screening is not conducted during the early stages of the disease. It is important that all Americans receive the appropriate CRC screening starting at the age of 50 if the individual is an average risk for CRC. According to the ACS (2018a)

guidelines, a person at average risk is defined as an individual that does not have a personal or family history of CRC, certain types of polyps, history of inflammatory bowel disease, or confirmed or suspected hereditary colorectal syndrome. The administration of a test to detect early signs of cancer, such as blood in the stool and precancerous polyps in seemingly healthy populations, is considered CRC screening (Maida et al., 2017). There are currently six different modalities of CRC screening for adults at average risk for CRC and between the ages of 50-75. See Table 1 for different modalities, frequency, and definition.

Table 1

Colorectal Screening Modality, Frequency, Tier Rating, Sensitivity, Specificity, and Definition

CRC Screening Modality	Recommended Frequency	Tier	Sensitivity (True Positives)	Specificity (True Negatives)	Definition
Guaiac-based fecal occult blood test (gFOBT)	Every year	Unrated	33%***	97%***	This test can detect blood in the stool.
Fecal immunochemical test (FIT)	Every year	1	93%** 79%*	91% ** 95%-96%*	This test can detect blood in the stool. This test is the new version of gFOBT and requires a restrictive diet.
Fecal DNA test (DNA-FIT)	Every 3 years	2	92.3%**	86.6%9** 87%-90%*	Combination test for blood in the stool, FIT, and abnormal genetic material identification.
Flexible sigmoidoscopy (FSIG)	Every 5 years	2	94% *** (distal colon only)	100% *** (distal colon only)	Procedure that uses a flexible narrow tube to inspect the rectum and part of the colon to identify CRC and polyps
CT colonography (virtual colonoscopy)	Every 5 years	2	66.8%*	80.3%*	Procedure that inspects the colon using a three-dimensional image to identify CRC and polyps
Colonoscopy	Every 10 years	1	94% ***	100% ***	Procedure that uses a flexible narrow tube to inspect the rectum and entire colon to identify CRC and polyps. This can also be a diagnostic procedure used to remove cancerous or precancerous polyps.

Note: Recommended screening modalities, frequency, tier, sensitivity, specificity, and definitions. Screening modalities recommendations and definitions from U. S. Preventative Service Task Force (USPSTF) (NIH, 2020a). Multi-Society Task Force ranking of CRC screening into tiers based on performance and costs (Rex et al., 2017). Sensitivity and specificity (Issa & Nouredine, 2017)*, (Maida et al., 2017) **, (NIH, 2020b) ***.

In June 2017, the United States Multi-Society Task Force on Colorectal Cancer (USPSTF) issued updated screening recommendations that the FIT and colonoscopy are both in the tier 1 category based on their effectiveness (Cabebe, 2020). Due to high specificity and sensitivity, colonoscopy is considered the gold standard screening test (Issa & Nouredine, 2017).

There are notable racial differences in CRC screening completion rates between non-Hispanic whites, non-Hispanic blacks, Asian American, Pacific Islanders, and American Indians. For individuals between the ages of 50-75, the biggest disparities are in race (white, 69%, and Asian Americans, 58%), education (college graduate, 73%, and less than high school, 53%), immigration status (born in US territory, 84%, and in the US less than 10 years, 30%), and insurance status (private and Medicare, 80%, and uninsured, 30%) (ACS, 2020b).

Purpose of the Inquiry

The U.S. Preventative Service Task Force (USPSTF) has recommended several CRC screening tests that can decrease the potential for CRC cancer; however, despite the fact that different screening options are available, many Americans at risk are not being screened. According to the National Institute of Health (NIH) (2020), in 2018, 68.8% of adults aged 50-75 were up to date with CRC screening based on USPSTF guidelines. The uptake of CRC screening has increased during recent years. The rates are near the Healthy People 2020 goal, 70.5%, which was estimated in 2008 based on responses from the National Health Interview Survey (Healthy People 2020, 2020). However, that leaves 30% of Americans that have not been screened for CRC.

The purpose of this scholarly integrative review is to explore the reasons individuals are not completing CRC screening, Interventions that address the barriers need to be identified and

implemented to increase CRC screening rates. Colorectal cancer screening is a grade 'A' recommendation from the (USPSTF, 2016), which means there is strong evidence that CRC screening can decrease the mortality and incidence of CRC. A better understanding about perceived barriers, including those related to different US populations could assist health care organizations in implementing interventions for increased CRC screening.

Question Guiding the Inquiry

The questions guiding this inquiry are:

What are the perceived barriers to CRC screening in Americans aged 50-75 years old?

- a. Is there a difference in barriers based on populations?

Method Used for the Inquiry

An integrative review of literature was completed using Winona State University online library resources and the Midwest Health Care System database. Keywords and phrases were entered into MEDLINE, PubMed, Cochrane Library, OVID, and CINAHL with Full Text. Article titles and abstracts were reviewed for appropriateness to address inquiry related to the research question. Thirty-five studies were screened using the following inclusion criteria: evaluate barriers associated with CRC screening as their outcome, publication date within the last 10 years, and studies relevant to populations within the US. Exclusion criteria eliminated 20 studies that were based on: not addressing more than one type of barrier or type of CRC screening test. A review of the articles' references yielded an additional two articles.

Summary

The second most frequently diagnosed cancer in the US is CRC and with an early detection of CRC an individual has as a 5-year survival of 90%. In 2018, the CRC screening rate in the US was 68.8%. Health care organizations need to identify the rationale for low CRC

uptake rates within the populations that are served. A review of the literature was completed using five databases to understand the barriers. Screening barriers can be complex and multifaceted and involve many factors, from individual to societal (Katz, Young, Zimmerman, Tatum, & Pakett, 2018). The types of interventions to be implemented should address many of the barriers identified.

II. LITERATURE REVIEW

Introduction

The literature review identifies the analysis and process used to determine articles relevant to the question of inquiry, and provides a thematic analysis of those items. In total, 17 articles were used to answer the question of inquiry. Appendix A summarizes the keywords used to complete the search in the following databases: Ovid/MEDLINE, PubMed, CINAHL, Cochrane, and other government internet sources. The literature review included articles with published dates from 1/1/2010 to 12/31/2020 to allow for discovery of barriers most relevant to current populations. Article titles and abstracts were reviewed for appropriateness to address the question of inquiry. Thirty-five full-text articles were evaluated using the following inclusion criteria: study population was within the US, more than one barrier associated with CRC screening was evaluated, and study included more than one type of CRC screening. Articles were excluded if there was reference to other countries' barriers due to differences in governmental guidelines, insurance payer configurations, and different socioeconomic factors. Figure 1 is a flow chart diagram of the literature search and selection process for articles found in each data base, how many abstracts were reviewed for appropriateness, and the literature description of the articles selected. Eliminated from the literature review were 35 studies where the study was not conducted in the US, only addressed one type of barrier, or only addressed one

type of CRC screening. The intent of the literature review was to develop a comprehensive overview of all potential barriers identified by adults in the US and not focus on studies that explored only one barrier or one type of screening test. Articles that reviewed more than one barrier allowed comparison of all barriers equally and articles that reviewed only one type of screening did not give more emphasis to a specified test. Through the review of articles' full-text and references two additional articles meeting the inclusion criteria were located and added to the references. Table 2 identifies the level of evidence of the 17 articles included in this literature review. The articles in the literature were a lower level of evidence due to the descriptive nature of the research question. The level of evidence was both levels V and VI according to Appendix C.

Table 2

Literature Review Level of Evidence

Level of Evidence	Number of Articles Used
I	0
II	0
III	0
IV	0
V	3
VI	14
VII	0
Total	17

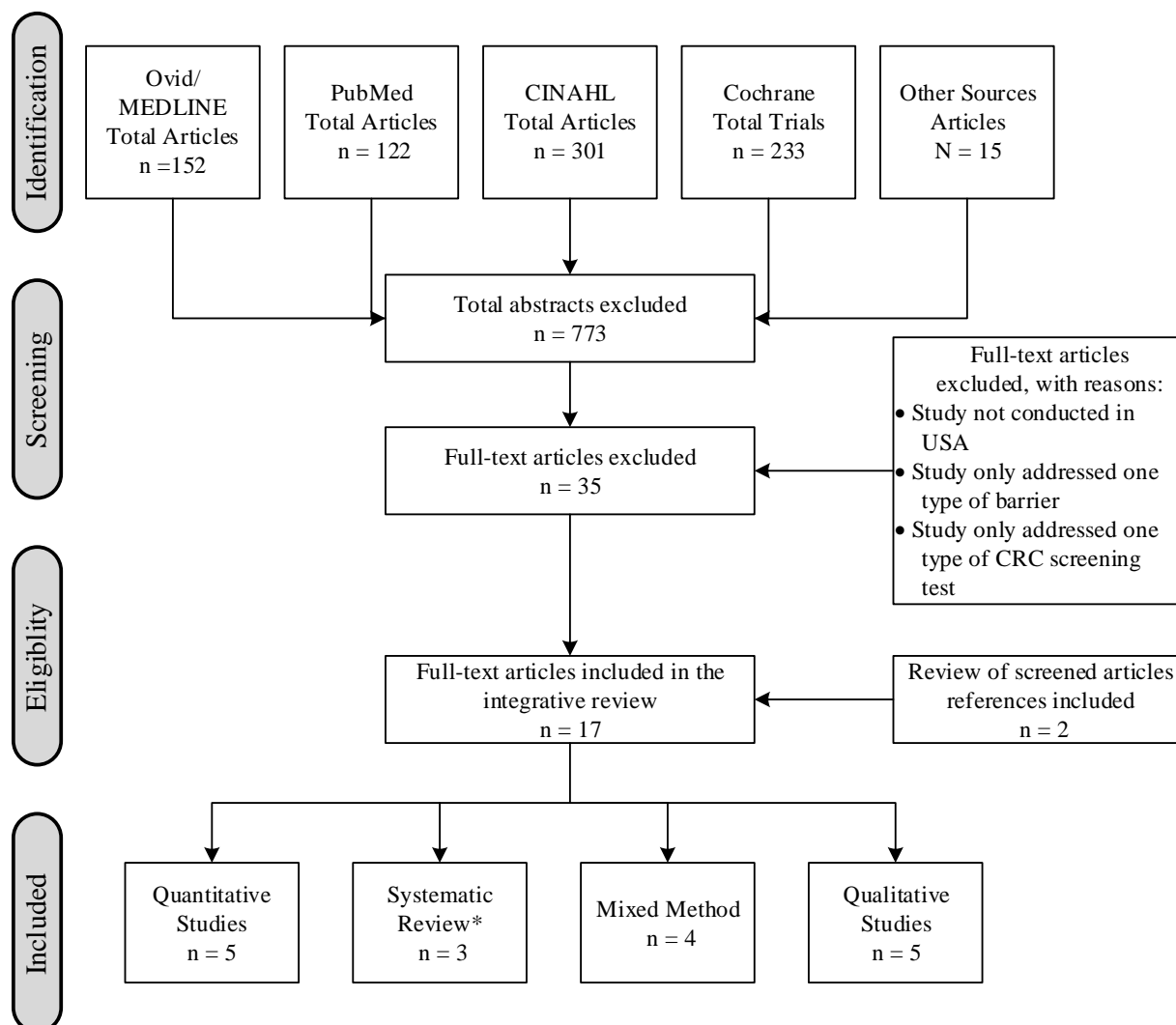


Figure 1: The flow chart diagram of literature search and selection process using search terms: “Colorectal cancer screening, CRC, adher, complian, reason, complet, barrier, uptake, and determin”. *The authors described these articles as systematic reviews. Since the studies included are mostly qualitative, they might be better described as integrative reviews

Synthesis of Literature

After a review and analysis of the literature, relevant information was extracted from each article and entered into a literature table for analysis (see Appendix B). The results section of the literature table identified many individual barriers, which were incorporated into a theme matrix. The theme matrix identified different types of barriers and assisted in the categorization of themes and subthemes. Three main themes related to barriers to CRC were identified, patient, system, and provider-related barriers. Patient-related barriers are sometimes a consequence of

system- and provider-related barriers. Several of the barriers discovered in the literature are interwoven, where one barrier potentially affects another barrier. The three common themes, and their sub-themes are discussed.

Patient-Related Barriers:

Lack of knowledge and awareness. Lack of knowledge and awareness can be detrimental barriers that affect decisions of individuals whether to participate in CRC screening. Lack of awareness can play a role in an individual's fatalistic views and perceived fears related to CRC. Study participants who were not up to date with screening stated the first barrier was "being aware of test" (Kim et al., 2018, p. 699). A participant in Honein-AbouHaidar et al. (2016), stated that colorectal cancer must not be, "that important, or [I] would have heard about it" (p. 909). If individuals are knowledgeable about CRC and CRC screening they will be empowered to make informed, individualized choices about appropriate CRC screening tests. According to Nagelhout, Comarell, Samadder, and Wu (2017), 25% of participants in their study identified that being unaware of the need for a colonoscopy was a barrier. Lack of knowledge was noted by Jones, Devers, Kuzel, and Woolf (2010) to include individuals' requests for details about CRC screening, from disease prevalence to insurance coverage. The Davis et al. (2013) study mentioned that 96.1% of Federally Qualified Health Centers (FQHC) participants had heard of CRC, but only 56.3% had heard about a test to screen for CRC. Amongst Asian Americans, Tsoh et al. (2018) revealed that if an individual knew one or more (USPSTF) screening guidelines the odds of screening intention doubled. Nagelhout et al. (2017) note that awareness of CRC screening was lower in Pacific Islander and Hispanic individuals compared to white individuals. Among Chinese and Korean communities, CRC was identified as not being as well-known-compared to other cancers (Jung et al., 2018). Increasing health literacy is

intertwined with increasing awareness in minority populations. Individuals' awareness can affect their views of cancer, misconceptions about the importance and efficacy of CRC screening modalities, and attitudes towards screening (Honein-AbouHaidar et al., 2016). An important barrier that needs to be addressed is that some individuals do not value preventative health care when asymptomatic. According to Jones et al. (2010), 4.1% of the participant-reported barriers in the open-ended survey were 'no problems or symptoms', which is a misconception that individuals who are asymptomatic do not need to be screened. Jung, et al. (2018) note that individuals who are asymptomatic were significantly less likely to have CRC screening compared to those who did not have the same misperception that CRC is only present with symptoms. The concern with this barrier is that CRC treatment is likely to be most successful if detected at an early stage of CRC and the removal of polyps can reduce mortality (USPSTF, 2016).

Fear. Fear can be multi-faceted and intertwined with many different barriers. Fear was referenced relative to some aspect as a barrier in almost every article reviewed. At times it was difficult to discern which barrier the individual was anxious about. Jones et al. (2010) noted that approximately 20% of participants also stated different interpretations of fear, such as, fear of a cancer diagnosis, invasive procedure, complications, family ramifications, and test results. Fear can take on different meanings such as fear of the procedure, including technology, the procedure room, sedation, fear of embarrassment and invasion, and fear of cancer. Jones et al. (2010) identified fear (10.1%) as the top patient-related barrier for why individuals did not complete CRC screening. Muthukrishnana, Arnolda, and James (2019), identified that 29.5% of individuals described fear as a barrier in completing CRC screening, which was greater than financial barriers at 25%. Other mentions of fear were in relation to placing a burden on the family, which included assistance with transportation and translation. Fear was used as a

facilitator of CRC screening by an individual to convince family members that they should take steps to complete CRC screening (Bachman et al., 2018). Fear is a strong emotion that can outweigh an individual's decision to complete the screening. Bachman and colleagues suggest that: "focusing on communication strategies providers use to respond to fear and manage screening uncertainty is critical, particularly in the case of colonoscopy where the treatment (of removing polyps), itself, may be a cure" (Bachman et al., 2018, p. 1291). Fear can play two different roles in an individual's decision to complete their CRC screening. On one hand, fear can relate to the procedure, but on the other hand, an individual may have fear related to not completing the screening. "It's not I would fear what the results might be, that's one thing about it. I fear they might discover something, and then on the flipside of the coin I fear that if I don't have it [colonoscopy] and there is something that I waited too long" (Green et al., 2017, p. 5).

Concerns related to screening tests. Pain and discomfort were barriers that were closely related to fear in the articles reviewed. The literature stated that some individuals were afraid of the pain with the procedure and others experienced pain after having a colonoscopy. In the Wang et al. (2019) study, participants in a rural population were concerned about the discomfort associated with the preparation and worried about the pain of the procedure. Discomfort or disgust with the procedure was barriers for 11.5% of the participants in the Muthukrishnana et al. (2019) study. A cultural barrier to pain described in the Kim (2018) study noted that the Korean culture tends to endure pain and not seek medical care until it is potentially too late and CRC is diagnosed. This type of barrier to pain is different to the pain described in other articles that are related to the concerns with colonoscopies. African Americans rated pain associated with colonoscopy significantly higher than whites, $p < 0.001$ (Wilkins et al., 2017). Jones et al. (2010) indicated when evaluating open-ended questions, pain (7.6%) was the fourth

most common patient-related barrier why individuals do not complete CRC screening. This ranked behind fear (10.1%), unpleasant preparation (7.9%), and not aware and lack of knowledge (7.9%). Obese, women were more likely to report pain and embarrassment as test-related barriers (Seibert, Hanchate, Berz, & Schroy, 2017).

On the basis of a qualitative analysis Jung et al. (2018) identified concerns related to complications. Many other studies also noted that individuals were apprehensive about potential complications related to using the tubular instrument during flexible sigmoidoscopy and colonoscopy. Wilkins et al. (2012) identified the fear of a torn or perforated colon during colonoscopy as a significant difference between individuals who were current with the screening verses those not current ($p = 0.002$). On the basis of a systematic literature review, Honein-AbouHaidar et al. (2016) suggested some of the main reasons individuals do not participate in colonoscopy testing is the risk of perforation, need for bowel preparation, and discomfort related to the procedure. Individuals reported adverse effects of bowel preparation such as drinking the preparation made them nauseated, they were unable to keep the preparation down, and vomiting (Bachman et al., 2018). Not only is the bowel preparation uncomfortable, but individuals also have a concern that the bowel preparation will not be completed properly and the colonoscopy will need to be rescheduled. Lack of proper preparation often requires the individual to re-schedule the test, but many individuals cannot afford to take another day off work or travel the distance to the testing site. Rescheduling of appointments can utilize scarce resources in remote rural areas as only one appointment was billable. The cancelled appointment slot was then not able to be used by another individual who may have difficulty with full appointment slots. According to Jones et al. (2010) women are more likely to state concerns with bowel preparation than men (12% vs 6%, $p < 0.01$). Patient-reported barriers for adverse effects of bowel

preparations from the Jetelina et al. (2019) study stated 3% of individuals mentioned this barrier. Risk of bowel perforation is an individual perceived barrier that can be addressed with nurse-led education. Hamdani et al. (2013) noted the incidence of bowel perforation in normal colonoscopies is 0.06%.

Individuals who participated in the studies reviewed had different opinions about the potential accuracy of the different CRC screening modalities recommended by the USPSTF and ACS. Participants in the Jones et al. (2010) study believe that some of the suggested tests are inferior, outdated, or a cheap substitute for a colonoscopy. However, the complexities involved in scheduling the test and completing the bowel preparation caused them to delay getting the colonoscopy despite being offered a fecal test. The goal of identifying CRC could be threatened by attitudes that challenge the efficacy of appropriate CRC modalities. Individuals who delay or refuse the colonoscopy due to multiple barriers and are not offered equivalent alternatives could eventually result in not undergoing any type of screening. A participant in the Green et al., (2017) study stated, “If the stool was more accurate I would do the stool” test (p. 9). According to Table 1 on page 3, both colonoscopy and FIT testing are tier one recommendations from USPSTF. The sensitivity of both colonoscopy and FIT testing are relatively equal at 94% and 93% respectively (Maida et al., 2017, & NIH, 2020b).

Individuals faced with health care decisions may not only rely on the advice from the provider, but the experiences of others to form the opinion as to whether a procedure is safe and effective. According to Kimura, Sin, Spigner, Tran, and Tu (2014), individuals who had previously completed CRC screening had concerns about risks after knowing about complications experienced by others. Katz et al. (2018) indicated that 8% of individuals reported a barrier to completing CRC screening because a close friend or family member recommended

not having the screening or the individual heard about a bad experience with CRC screening.

Jones et al. (2010) stated that adverse experiences and personal stories told by family and friends reduced the eagerness for CRC screening.

Cultural, familial, and gender barriers. Cultural, familial, and gender barriers related to the specific population within each study and included language barriers, and familial and cultural beliefs. The literature stated differences in screening rates and screening test completed between whites versus African American (Wilkins et al., 2012). Kim (2018) cited acculturation to Western culture as a barrier to CRC screening for Asian Americans. Wang et al. (2018) discussed how those minority groups who are average risk individuals for CRC, between the ages of 50-65, non-English speaking, and uninsured were less likely to follow the USPSTF guidelines for screening. For example, preventive medicine is not a common culture within Asian-American communities (Kim, 2018).

Focus groups underscored that it was considered taboo to discuss CRC screening openly in public because it is different than talking about breast or prostate cancer (Jones et al., 2010). Honein-AbouHaidar et al. (2016) noted that a discussion regarding preparing fecal matter for screening was a social taboo and a threat to an individual's hygiene, which decreases the motivation for uptake of CRC screening. Sexual sensitivities were cited as a barrier by Jones et al. (2010) in individuals who have had past sexual abuse or are of homosexual identity.

Asian Americans expressed that language and cultural differences were major barriers to CRC screening, with difficulty understanding medical terminology (Jung et al., 2018). Honein-AbouHaidar et al., (2016) noted that among non-English speaking individuals the language barrier made it difficult to understand and follow instructions regarding how to collect a fecal sample correctly.

Avoidance. Avoidance is the act of avoiding unpleasant events or difficult thoughts. Stress can bring on feelings of avoidance. Individuals tend to avoid an event that they do not trust or understand. One type of avoidance is to not think about the event. A participant in a study reported by Green et al. (2017), who was not up to date on CRC screening stated “I don’t want to think about it” when referring to the risk of CRC (p. 4). A male participant in the Green et al. (2017) study, referred to gender differences in self-care, stated, “I’d not been actually taking care of myself, that guy thing of ignoring the doctors and all... Basically just ignoring the fact that I was getting older” (Green et al., 2017, p. 5). Fear can also be expressed through avoidance. One study participant stated, “I ducked and dodged the appointment as long as I could” when referencing fear about making an appointment for CRC screening (Muthukrishnana et al., 2019). Avoidance can be intertwined with other barriers such as pain, fear, cost, or language, which can influence an individual to not complete CRC screening and potentially developing CRC. It is important to understand the barriers that are causing the avoidance behavior to educate individuals on the importance of CRC screening.

Individuals, regardless of gender or age, reported embarrassment and privacy concerns as barriers to CRC screening due to the technology scoping of private body parts (Bachman et al., 2018). Two participants in the Bachman et al. (2018) study referred to the procedure occurring in a “very delicate place” and fear of “being violated” (p. 1288). Honein-AbouHaidar et al., (2016) identified that CRC screening was avoided due to embarrassment related to the area being investigated and individuals having “zero dignity in the procedure” (p. 911). Embarrassment was also considered a fear in relation to the colonoscopy procedure (Jones, et al., 2010).

Several studies reveal that individuals consider CRC screening not a priority relative to other obligations of life (Green et al., 2017; Honein-AbouHaidar et al., 2016; Jung et al., 2018;

Knight et al., 2015; Muthukrishnana et al., 2019, & Nagelhout et al., 2017). Today, people have many life demands that compete with preventative health care services (Muthukrishnana et al., 2019).

Another barrier for individuals when dealing with completing CRC screening is multiple health comorbidities (Kimura et al., 2014). In one study which asked participants why CRC screening was not completed despite numerous attempts of mailed fecal tests, the answers were avoidance, competing health concerns, and handling of stool (Green et al., 2017). A participant in the Jung et al. (2018) study stated, “in an immigrant’s life ... we’re too busy to live ... we have to work until Saturday so we cannot go at the time that we want’ (p. 855). As with individuals who have too many competing demands in their life, several people cannot take on one more demand when they have multiple health complications (Muthukrishnana et al., 2019). Vietnamese men cited diabetes as causing difficulty related to the bowel preparation due to the need to fast prior to the colonoscopy (Kimura et al., 2014). Jones et al. (2010) also noted that demands of diabetes were a barrier for participants, along with having a spouse with an illness.

Socioeconomic barriers. Several socioeconomic barriers were discussed in the literature. One of the barriers is cost of the CRC testing, especially colonoscopy. The average cost of a colonoscopy can range from \$600 - \$5,400 if uninsured (Pinder, 2018). It is difficult to navigate the true cost of colonoscopies due to insurance fine print and copays so it is not uncommon for individuals with lower socioeconomic status to forego CRC testing. When comparing individuals with lower income levels to individuals with higher levels, the barrier of lack of income is evident in relation to the percentage of patients completing CRC screening (Kim, 2018). Literature indicated that barriers such as poverty, socioeconomic factors, health literacy, and insurance coverage are related to an individual’s CRC screening behavior (Wang, et

al., 2018). Wang et al. (2018), discussed that rural, low income residents cited that the high cost of the tests and follow-up care was one of the major barriers to CRC screening. Demographic factors including employment status and lower monthly income were also identified as barriers to CRC screening among Korean Americans, Chinese Americans, and Japanese Americans (Kim, 2018).

Low literacy is another socioeconomic barrier discussed in the literature. The Center for Disease Control and Prevention (CDC) (2019a) defines health literacy as the “degree to which an individual has the capacity to obtain, communicate, process and understand basic health information and services to make appropriate health decisions” (p. 1). According to Honein-AbouHaidar et al. (2016) it is difficult for individuals with low socioeconomic status and poor health literacy to understand medical terms used in provider discussions related to parts of the body such as the rectum and colon. The CDC noted that 88% of US adults have inadequate or marginal literacy skills (CDC, 2019b). Miller and colleagues identified that patients with limited literacy skills have decreased knowledge of CRC screening (Miller, Brownlee, McCoy, & Pignone, 2007).

Jones et al. (2010) noted lack of family and close friends, along with inadequate social support, as barriers to CRC screening. Emotional support from family and friends could be beneficial in the decision-making process regarding appropriate CRC screening modalities, especially among Asian Americans (Kim, 2018). Individuals discussed that being alone was a barrier and that social support could be an encouragement when undergoing CRC testing (Jones et al., 2010).

Fatalism. Fatalism can be defined as the tendency of individuals or groups to believe that their futures are determined by an unseen power rather than by their decisions (Maercker,

Ben-Ezra, Esparza, & Augsburger, 2019). Research has shown that fatalism is common across many cultural groups, including Koreans, Hispanics, Asians, and African Americans. Green et al. (2017) described fatalism as a key barrier to CRC screening, which could be interpreted as a type of avoidance behavior. Kim (2018) identified fatalism as a barrier among Asian Americans. Fatalism has been theoretically proposed as a type of global belief system that can play a significant role in an individual's decision about health screening behaviors. Through the fatalist view, one's perception of control over the disease is decreased; leading to the belief that screening is unlikely to make a difference to the outcome. Many individuals expressed fatalistic views that nothing can be done to prevent CRC, as well as, the concept of self-care, meaning that they can take care of their own health through diet and exercise. One focus group participant stated, 'It's all fate. Living and dying is up to God. We can't change it' (Jung et al., 2018, p.860).

System-Related Barriers:

Respondents in several studies acknowledged multiple challenges that can complicate efforts towards completing CRC screening; for example, the complexity of health care can deter patients from seeking preventive services. Individuals without transportation list this as a barrier in completing CRC testing (Jung et al., 2018; Honein-AbouHaidar et al., 2016; & Wang et al., 2019). Jung et al. (2018) identified the difficulty of finding an appropriate provider and making an appointment for CRC screening as barriers to overcome.

More than half the articles reviewed stated that access barriers were a substantial reason for noncompliance with CRC screening. The two most frequently mentioned barriers were the absence of screening facilities within the local community and scheduling and rescheduling challenges. The difficulties of trying to find a local facility and scheduling the CRC screening led to avoidance.

The most frequently cited system-related barrier in the literature reviewed was lack of insurance. The literature suggested that both rural and urban communities have the same significant barriers to CRC screening completion: lack of physician recommendation and cost or lack of insurance (Jones et al., 2010). According to Wang, et al., 2018, at the county level, structural barriers of lack of health insurance, poverty, and lack of medical specialists, especially gastroenterologists, were significantly related to CRC screening completion, after controlling for provider and individual characteristics.

Confusion exists about insurance coverage and the details of what screening modalities are covered (Jones et al., 2010). ACS (2018d) states the Federal Affordable Care Act law requires insurers and Medicare to cover the costs of colorectal cancer screening tests that are recommended by USPSTF. There is a stipulation that this law does not apply to insurance policies that were in place prior to March, 2010. Individuals with low health literacy or reading level may have difficulty understanding insurance rules and, therefore, this barrier makes it difficult to complete CRC screening. The federal government did issue a policy change in February 2013 for individuals with private insurance. Those individuals will no longer be responsible for copayments if a precancerous polyp is discovered during a colonoscopy. This policy does not cover Medicare individuals. The Removing Barriers to Colorectal Cancer Screening Act (2012) was introduced into the House of Representatives on March 1, 2012, and was referred to the Committee on Energy and Commerce. The purpose of this bill was “to amend title XVIII of the Social Security Act to waive coinsurance under Medicare for the colorectal cancer screening test, regardless of whether therapeutic intervention is required under screening” (Removing Barriers to Colorectal Cancer Screening Act, 2012, p.1). On Jan 3, 2013

the bill was stalled and has not been reintroduced. Colonoscopy is an effective modality for CRC screening and removing the financial barriers can help increase the uptake of screening.

Provider-Related Barriers

The theme of patient-reported perceived barrier - lack of provider recommendation, was the most prominent barrier discussed throughout the literature reviewed. Even though many individuals ranked this as an important barrier to CRC screening, only 10.9% of participants in one study reported providers not referring for CRC screening (Muthukrishnana et al., 2019). Many of the studies reviewed used data from surveys completed after the patient's encounter with the provider, so it is possible that providers did recommend, but participants did not understand or remember the recommendation. An important health care disparity among individuals who have not completed CRC screening is the barrier of not having a regular health care provider (36.1%) and those with no health insurance (40%) (Joseph, King, Dowling, Thomas, & Richardson, 2020). A facilitator that can lead to better communication is having a consistent provider that the individual can trust. Individuals who do not have a regular primary care provider are at a disadvantage because the provider that they see only once will lack the knowledge and understanding of the patient's health history and trust in the provider may be lower. Lack of this relationship makes it more challenging to recommend an appropriate CRC screening test.

Appropriate patient-centered communication needs to focus on understanding the patient's perspective, psychosocial context, and values to generate a high level of trust (Epstein et al., 2005). If providers are going to empower individuals to share in decisions related to their healthcare, effective communication is needed to build relationships. Bachman et al. (2018) discovered that individuals wanted their providers to understand their knowledge and attitudes

about CRC screening so there could be appropriate patient-centered communication with the provider to determine the patient's preference for testing modality. Individuals perceive that providers may not have enough time to cover all their requests during the encounter. Providers stated that they do not have enough time to complete chronic disease management and recommended screenings during an encounter where patients might have other health issues that take a higher priority for discussion (Grant, Adams, Bayliss, & Heisler, 2013). When the patient does schedule a visit with the provider, the visit is usually for an acute concern and the focus is not on preventive health care. Even if there is time to discuss preventive services, the provider's perception is that many patients will refuse due to cost or access issues especially in rural or underserved areas. Provider shortage can also play a role in the provider's recommending screening (Wang et al., 2019).

Another provider-related barrier mentioned in the literature was the provider's use of terminology that is unfamiliar to the patient. Participants in the Bachman et al. (2018) study requested that providers use more lay language and straightforward explanation of screening so that they can comprehend the information better. One participant in the Green et al. (2017) study stated, "I really didn't understand it as a screening" (p. 5). This lack of understanding is a result of inadequate explanation of the different types of CRC screening tests. Individuals also felt that providers were not sensitive enough to their needs when discussing CRC screening options. Individuals at times feel embarrassed or uncomfortable about the topic so providers need to exhibit a greater sensitivity to patients. Jones et al., (2010) emphasized the value of a personalized rationale statement for each patient. Individuals have a desire for more CRC information which could improve their understanding of the disease process and help diffuse the fear of cancer detection. When providers take the time to discuss the importance of CRC

preventive screening and help individuals understand the rationale, there is a greater potential for uptake of CRC screening test completion (Bachman et al., 2018). When providers are able to discuss CRC, colonoscopies are recommended by primary care providers more frequently (43.4%) than other screening modalities (Dignan, 2014). One explanation may be that providers lack evidence-based information that other modalities are available and have been recommended as optional screening tests. According to Wilkins et al. (2012), African Americans stated physician recommendation was the most important factor for completing CRC screening.

Several studies referenced individuals' mistrust with providers or the health care system as a barrier to completing CRC screening. To diffuse this barrier, providers need to have open patient-provider communication related to the goal of CRC screening to alleviate any concerns on the part of the individual (Epstein et al., 2005). If an individual has more system-related barriers, such as insurance coverage, socioeconomic conditions, or poverty, these can affect the individual's behavior related to mistrust. Hispanics commonly endorsed a lack of trust in their provider (Nagelhout et al. 2017, p. 791). Muthukrishnana et al. (2019) stated that medical mistrust was mentioned by 2% of the participants.

Strength and Limitations

This review of literature demonstrates a number of strengths. First, is the analysis of studies that are less than 10 years old to address patient, system, and provider-related barriers that are relevant to current populations. Populations have changed over the last 20 years so it is important to find the most relevant barriers. Second, the review includes a number of qualitative studies that have allowed individuals to describe their perceived barriers in their natural language. Third, several studies had large sample sizes with a combination of methods to gather information. Fourth, all literature reviews were limited to the US, which will make the findings

more generalizable to the US population. Lastly, several different cultural populations were reviewed to develop an accurate understanding of cultural barriers that exist.

This review of literature also demonstrates several notable limitations that should be considered prior to application of findings. First, no level I, II, or III evidence studies were identified for inclusion in this review. Second, several studies were only completed within one state within the US. Third, several studies used individual self-reported barrier and CRC screening completion data for the surveys or focus groups which can skew the data due to individuals not remembering exactly why they did not complete the CRC screening. Lastly, not all the studies completed a cognitive test for participants' comprehension of health terminology.

Summary

Understanding the barriers to CRC screening is essential when determining an intervention to increase the uptake of screening. Some barriers are more prominent amongst individuals than others. This scholarly inquiry paper focuses on barriers that, if eliminated, can support increasing uptake of CRC screening. Lack of provider recommendation is a barrier that needs to be addressed. This can be a lack of time on the provider prospective or added assistance from other care team members in taking a more active role in individual education. Gaps in knowledge and awareness are prominent barriers that nurses can assist individuals in addressing. Awareness can create motivation in individuals and lead to positive attitudes about CRC screening. With understanding of the individual's cultural beliefs, influence of family and friends, and personal experiences, an individualized plan can be discussed. Understanding the barriers that are relevant to different populations is important to inform the design of effective interventions.

III. CONCEPTUAL FRAMEWORK

Conceptual Model

The Health Belief Model (HBM) has been widely used as a conceptual framework in health behavior research and can help identify why individuals do not participate in programs to detect or prevent disease (National Cancer Institute, 2005). This model was chosen as a theoretical framework to guide the development of a multi-faceted intervention to affect health behaviors related to CRC screening based on individuals' barriers identified in the literature. Champion and Skinner (2008) noted that "The HBM contains several primary concepts that predict why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and most recently, self-efficacy" (p. 46-47). For the purpose of understanding the HBM in relation to CRC in this scholarly inquiry, definitions and examples can be reviewed in Table 2.

Table 2

Health Belief Model Constructs, Definitions, and Examples

Construct	Construct Definition and Example
Perceived Susceptibility	Belief that one has a risk of getting a disease <i>I believe I can get CRC.</i>
Perceived Severity	Belief about how serious the disease can be <i>I believe CRC can cause death.</i>
Perceived Benefits	Belief that an intervention reduce the risk <i>I believe that CRC can be prevented with appropriate screening.</i>
Perceived Barriers	Belief about the perceived negative effect of advised action <i>I believe if there are no symptoms present you are not at risk of CRC.</i>
Cues to Action	Internal or external trigger to complete an action <i>My neighbor was just diagnosed with CRC</i>
Self-Efficacy	Confidence in one's ability to achieve the required behavior <i>I believe that with the education about CRC, I can be successful in completing CRC screening.</i>

The conceptual map in Appendix D describes how the barriers identified in the literature relate to the HBM. The patient, system, and provider-related barriers are all examples of perceived barriers in the HBM, and this is designated by a solid line. There is less direct evidence in the literature reviewed, but some suggestions, that some of the patient, system, and provider-related barriers relate to perceived severity and perceived susceptibility. These relationships are designated by a dotted line in the diagram. For example, the patient-reported barrier *concerns related to CRC screening test* is a perceived barrier, however, the belief that it is possible to acquire CRC from the test could contribute to perceived susceptibility. The same can be true with system and provider-related barriers. For example, if the patient perceives that they are at low risk for CRC, an appointment for CRC screening, or discussion with a health care provider about screening options may not be a high priority for them.

Perceived barriers and perceived benefits together influence the potential for health behavior change. If the perceived benefits are greater than the perceived barriers, the individual will be more receptive to health promotion and behavior change according to the HBM (Janz & Becker, 1984). The cues to action, which include the multicomponent interventions listed, are directly associated with the perceived barriers and benefits as they can alter the individual's perceptions and overcome barriers, and this is illustrated with a solid line. If the interventions can have a positive effect on the perceived benefits, the perceived barriers will be diminished. The cues to action also have the potential to impact the individual's self-efficacy, which plays a major role in their confidence to manage the behavior change. The HBM also assumes that demographic, sociopsychological, and structural variables could affect an individual's beliefs and positively or negatively affect the promoted behavior (Janz & Becker, 1984).

The HBM does have a limitation in that it does not consider how emotions can affect behaviors (Champion & Skinner, 2008). Fear can be a positive or negative affect on behaviors of individuals needing CRC screening.

IV. CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS FOR NURSING

Introduction

The question guiding this scholarly inquiry was to discover barriers to individuals completing CRC screening that starts at the age of 50. The scholarly inquiry question was modified after reviewing the literature, when it became clear that criteria for CRC screening used was USPSTF recommended guidelines. A total of 17 articles were reviewed and three main themes were identified. The literature review suggested interventions that can be implemented into practice to address the individual perceived barriers. This section includes the conclusion, implications for nursing, recommendations, and summary.

Conclusion

The review of the literature revealed that individuals who meet the USPSTF CRC screening guidelines are often resistant to completing the appropriate CRC screening. Cancer of the colon is preventable, but if appropriate screening tests are not completed, CRC can remain undetected, resulting in mortality and morbidity. Even though CRC screening rates have increased since 2008, as a national society the goal of increasing the proportion of adults who have completed CRC screening to 70.5%, the goal set by Healthy People 2020 (2020) has not been achieved. The answer to the question guiding the inquiry was discussed in the literature review and divided into three themes, with a subset of themes under the first theme. The three main themes identified in the literature were patient, system, and provider-related barriers.

The first broad theme barrier was patient-reported barriers to colorectal screening which was further sub divided into multiple subthemes. The subthemes barriers that were mentioned the most in the literature review were individuals' lack of knowledge and awareness, fear, and avoidance. The most frequently mentioned barrier in the subtheme category of individual lack of knowledge and awareness was the perception that CRC screening was only necessary when symptoms developed. The most frequently mentioned barrier in the subtheme of fear was an individual's fear of receiving a cancer diagnosis after completing the CRC screening. The most discussed barrier in the literature related to the subtheme of avoidance was an individual's lack of time and competing demands. Socioeconomic barriers and fatalism were mentioned the least in the literature reviewed.

The second CRC screening barrier theme was system-related barriers. The most frequently mentioned barrier in this theme was access to health care facilities, which included scheduling challenges, absence of screening facilities in the area, and inadequate supply of specialists trained in colonoscopy or flex sigmoidoscopy.

The third type of barrier to CRC screening was provider-related barriers, which was mentioned in every article in the literature review. The barrier most frequently mentioned was the lack of provider recommendations for CRC screening when meeting face-to-face with providers.

There are different barriers associated with different populations. Five of the 17 studies reviewed in the literature focused on different ethnic populations, such as, Pacific Islanders, Hmong, Vietnamese, and Filipino, Korean, Japanese, Chinese Americans. Kim et al. (2018) discussed the barriers of different cultural views on Western medicine's preventative care

services and the influence of an individual's low acculturation. More research needs to be done to determine the gaps in identifying barriers for different populations within the US.

Implications for Nursing

Primary care involves a multidisciplinary team providing patients with continuity of care. The health care team provides patients with a wide spectrum of curative care and preventive services. The role of nursing in the primary care setting is a collaborative partner with other health care professionals. Nurses are an integral part of the health care team and can play a pivotal role in cancer prevention by educating patients and promoting preventative health screenings. According to Kim (2018), strategies are needed to support providers by implementing a multidisciplinary team with roles that can educate and assist patients with informed decision-making about their CRC screening. The use of motivational interviewing can be successful in face-to-face encounters as well as being adapted for telephone counseling sessions. Nurses are trained and educated to use motivational interviewing to help individuals change behaviors (Wahab, Menon, & Szalacha, 2008). Nurses use their observational and assessment skills to understand what knowledge individuals have about CRC and different CRC screening modalities to determine what education needs to be given. They can discern individual barriers and apprehension about completing CRC screening, which will facilitate the scheduling and completion of CRC screening. The nurse visit can also help facilitate assistance with other specific individual system-related barriers that the patient might encounter.

Implications for Education

Nursing education has primarily focused on inpatient nursing. Nursing education needs to prepare nurses to work in a variety of settings, including inpatient and outpatient nursing. Nursing education leaders need to design opportunities for nursing students to have clinical

experience in the outpatient setting. Nurses can play an important role in educating patients on preventative care through educational nurse led visits.

Implications for Research

Nursing research could evaluate the effectiveness of the nurse led CRC education visit using cohort or experimental designs, or by reporting on quality improvement projects. More research needs to be completed on the impact that outpatient nurses have on the recommendation of USPSTF of improving CRC screening rates.

Recommendations

Health care organizations are trying to determine the best interventions to assist individuals to successfully complete CRC screening. One type of intervention will not be enough to address all the barriers identified within this literature review. A multicomponent intervention is needed in order to encompass many of the barriers that individuals referenced. Subramanian et al. (2018) developed a framework to help organizations and communities evaluate and describe the steps needed to effectively implement multicomponent interventions for CRC screening. This framework was used with permission and adapted as a guide for a system wide approach for uptake of CRC screening in a Midwest Health Care Organization (see Appendix E).

The steps recommended for successful monitoring and implementation of multicompetent interventions are readiness, determine which multilevel interventions to implement based on community characteristics and patient population, identify quantifiable metrics that can be used to measure the success of the interventions, identify the CRC screening phases, determine the outcome measure most appropriate for the organization, and identify cost measures of implementation (Sabramanian et al., 2018). It is essential that those in leadership understand what kind of resources the organization has available to implement the CRC screening

intervention. For this scholarly inquiry paper, the intervention proposed is a nurse-led education visit to help patients increase their knowledge and awareness, reduce fear, address avoidance concerns, and take into account cultural, familial, and gender barriers.

Knight et al. (2015) cited that providers and administrators should consider the most common barriers when developing interventions for increasing CRC screening uptake. The literature review identified that the most frequently identified barrier mentioned by patients in the literature reviewed was provider-related concerns, with most of the emphasis on lack of provider recommendations during the face-to-face office visit. Providers do not have enough time during the office visit to answer all the patients' questions regarding CRC and CRC screening (Kim, 2018). The first recommended intervention to address this barrier is a nurse led visit completed by Care Team Registered Nurses (RN). The visit would focus on educating patients on the need for CRC screening and recommending an evidence-based option for CRC screening that meets the individual's health and emotional needs. The second recommendation is use of a tool kit, Appendix F, to help guide an educational, nurse-led visit, either in combination with a provider visit, or as a standalone nurse visit, to help explain that preventative screenings are important in detecting CRC, identify concerns and barriers patients have regarding CRC screening and instruct the patient on what steps are needed to complete a successful CRC screening based on the modality selected. This guide will include suggestions for patient education and discussion. Education can be tailored to promote increased awareness of the prevalence of CRC, discuss benefits and harm of CRC, discuss reasons the patient personally needs screening, inform the patient of steps and expectations involved in the CRC screening ordered, discuss self-care before and after the screening, talk about the pros and cons of each test, instruct the patient on how to determine what insurance will cover, discuss what

successful, early CRC treatment looks like, and discuss CRC screening survival rates. The nurse will be responsible for following the protocol (Appendix G), to help determine which CRC screening is recommended using USPSTF guidelines (USPSTF, 2016).

The education will need to be tailored by the nurse, using critical thinking skills, to potentially address system-related barriers, self-perceived fears, socioeconomic barriers, and fatalistic attitudes.

Other recommendations based on the literature review would be to consider more research on gaps in those populations that are under researched, such as different cultural populations and gender concerns. The literature search was limited in the number of studies related to all populations. The Affordable Care Act was implemented in 2014 to expand insurance coverage and increase access; however, disparities still exist in lower income individuals (Gaffney & McCormick, 2017).

The RN role has been expanding in Primary Care. A recommendation is to adjust the focus of nursing education to better prepare baccalaureate nurses for roles related to a primary care setting.

Summary

Identifying barriers to CRC screening is crucial in understanding the types of intervention that are needed to promote uptake of this evidence-based strategy for reducing morbidity and mortality from CRC. An integrative review of literature identified three main themes relating to barriers to CRC screening: patient-, system-, and provider-related barriers. Patient-related barriers were often the consequence of both system- and provider-related barriers. Reviewing the types of barriers that individuals are experiencing suggests that a multicomponent intervention is needed in order to impact as many individuals as possible. The theme that was

mentioned most frequently was provider-related barriers. Patient-provider communication is instrumental in changing an individual's view of their perceived threat of CRC. Providers need the assistance of the primary care team to provide the most effective education for patients.

This inquiry has resulted in the development of a nurse-led educational visit with the patient. A nurse-led visit will be able to address many of the patient-related barriers as well as the system- and provider-related barriers that were discussed in the literature. If patients see a perceived benefit to the nurse-led educational visit, individual behaviors regarding preventative screening will be impacted.

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APPENDIX A

Literature Search Results

Search Date	Key Words	Restrictions	Dates Included in Search	Database/ Source	Number of Hits/Number Reviewed	Number of Hits Selected
2/23/20	Colorectal cancer screening, CRC, adher, complian, reason, complet, barrier, uptake, determin	Abstracts and English	2014-2020	Ovid/ MEDLINE	152/152	8
	Colorectal cancer screening, barriers, adher, and determin	Abstract, English, Clinical Trial, Meta-Analysis, Randomized Controlled Trial, and Systematic Reviews	2010-2020	PubMed	122/122	4 After removal of duplicates
	Colorectal cancer screening, barriers, adher, and determin	Abstract, English, geography US, and academic journals	2010-2020	CINAHL with Full Text	301/301	1 After removal of duplicates
	Colorectal cancer screening, barriers, and uptake,			Cochrane	233 Trials/233	1 After removal of duplicates
	Colorectal cancer screening and barriers			Google	15	1

APPENDIX B

Literature Table

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Bachman, Cohen, Collins, Hatcher, Crosby, & Vanderpool (2018)	Identify barriers and facilitators to CRC screening guideline	Southeaster n Kentucky – Appalachia, eight- county area N = 40 Non- Hispanic, white, and English speaking Participants ≥ 50-75 years, not CRC screened, last 12 months Enrollment May – December 2015	Qualitative Diffusion of Innovation Framework analysis methodology, inductive referencing to derive categories Second step of coding examined the patient- centered communicatio n to identify concerns of CRC screening adherence	Semi-structured interview protocol was guided by principles of patient-centered communication Qualitative face-to-face interviews – gather patient stories about CRC screening practices Interview recorded, transcribed, and analyzed	<u>Barriers:</u> 1) Knowledge about CRC screening guidelines 2) Someone had a bad experience 3) Cumbersome bowel prep 4) Uncomfortable side effects of bowel prep 5) Fear of procedure/technology 6) Apprehensive about the scope 7) Concerns with sedation 8) Embarrassment – private parts/” being violated” 9) Invasive 10) Medical mistrust 11) Poor experience with technician/provider 12) Fear of cancer diagnosis 13) Lack of symptoms 14) Communication with family 15) Fear 16) No provider recommendation 17) Failure to present the options for CRC/more information 18) Gender of provider 19) Approach of conversation with sensitivity 20) Clear direct language 21) Recommend for money 22) Absence of screening facilities	Appalachian communities' geographic isolation and absence of screening facilities further compound barriers for CRC screening compliance Clear and direct patient-centered communication for rural populations Discussion of CRC guidelines offer more options and lay person information for decisional power	VI Limitations: Community Health Workers conducted the surveys, trained as lay research coordinators Future investigation in using family members on patient’s decision for CRC screening Use of FIT testing in rural areas Participant given \$30 gift card

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Davis, Rademaker, Bailey, Platt, Esparza, Wolf, & Arnold (2013)	Determine differences in CRC screening belief, barriers, knowledge, and health system experiences for rural and urban Federally Qualified Health Center (FQHC) population not up to date with CRC screening as related to FOBT	North Louisiana 8 FQHC 2 Urban Clinics N = 972 <u>Ethnicity:</u> 67.2% - African Americans 32% - White 1% - Other Enrollment August 2008 - June 2011	Qualitative Supplementary to a randomized controlled trial Descriptive data drawn from a randomized control trial Questions designed using Health Belief Model and Social Cognitive Theory Literacy was assessed using the Rapid Estimate of Adult Literacy in Medicine (REALM)	Oral interviews Questions used were validated CRC questionnaires Responses: yes, no, don't know, and open-ended. Barrier and 4 of belief used 5-point Likert scale, strongly agree, agree, disagree, strongly disagree, and don't know.	Rural vs Urban comparison: <u>Knowledge and Awareness:</u> 1) Aware of CRC – 96.1% 2) Knew someone who had CRC – 48.8% 3) Advertisement – 67.3% 4) Not aware of test to screen for CRC – 56.3% <u>Beliefs:</u> 1) Want to know had CRC – 91.3% vs 87.7%, $p = 0.006$ <u>Self-Efficacy:</u> 1) Correctly complete FOBT – 15.5% vs 4%, $p < 0.001$ <u>Barriers to FOBT:</u> 1) 'Strongly agree' instruction confusing – 12.2% vs 4%, $p = 0.005$ 2) 'Strongly disagree': embarrassing, 11.5% vs. 3.6%, $p = 0.003$, trouble, a lot of trouble 11.6 % vs 4%, $p < .0001$, or messy (8.7 % vs 1.6%, $p < .001$) 3) Putting it off – 26/9% vs 18.9% <u>Screening Recommendations:</u> 1) No recommendation - <50%, 36.4% vs 45%, $p = 0.03$ 2) No education information 3) Did not know I needed it 4) Put off the screening	Interventions are needed to improve CRC screening compliance, provider recommendation, and patient education Interventions need to meet the needs of community patients. Providers should acknowledge patients' barriers and facilitators to CRC screening	VI Limitations for generalization: Majority of patients were African American females. Study completed in one state. Participants spoke English Data self-reported, not confirmed with chart review Participation given \$10

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence Comments
Green, BlueSpruce, Tuzzio, Vernon, Shay, & Catz (2017)	Identify facilitators and barriers of patients with non-adherence screening especially, related to fecal testing. Determine interventions to improve adherence to CRC screening.	Washington State n = 41 Randomly selected Group Health members, age 50-73 years, not current for CRC screening according to national guidelines 46% had never completed CRC screening	Qualitative Iterative thematic analysis used for data Interviews completed from December 2013 – February 2014 Interviews were audio recorded and 30 min – 1 hour long. Descriptive thematic approach was used to analyze transcripts	Semi-structured telephone interview, 16 question interview guide Systems of Support to Increase Colorectal Cancer Screening Trial (SOS)	<u>Most common barriers:</u> 1) Avoidance 2) Procrastination <u>Other barriers:</u> 1) Aversion to stool 2) Fear of cancer diagnosis. 3) Lack of provider recommendation 4) Fatalism 5) Fear 6) Pain 7) Discomfort 8) Unpleasant prep 9) Risk of CRC was not a motivator 10) Difficulty not getting the colonoscopy completed 11) Avoidance related to health concerns 12) Taking time off to have test completed 13) No problems/ symptoms 14) Password issues with EHR 15) Test not accurate Male – 44% Female – 56% White – 70% African American – 30% Smoker – 25% Non-smoker – 75% Completed CRC screening after 3 years: Yes – 28% No – 72%	More studies on psychosocial constructs	VI Data collected were related to ongoing screening program Over sampling of males, race, and smoking status to assure representation of subgroups Small sample size Provided verbal consent – may have been more engaged Participants had health insurance Not all participants had never completed CRC screening Participants paid \$30

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Honein- Abou Haidar, Kastner, Vuong, Perrier, Daly, Rabeneck, Straus, & Baxter (2016)	Identify barriers and facilitators colorectal cancer (CRC) screening	94 articles reviewed Studies published between 2000 – 2014, except one.	Systematic Review – Qualitative meta-study Synthesis Critical Appraisal Skills Programme (CASP) tool Two-stage synthesis to develop an interpretation of CRC decisions Thematic analysis to group themes Meta-method to clarify the quality of studies	48 - in-depth interviews 37 - focus groups 4 - Combination interview/focus group 5 – Telephone /paper surveys – qualitative Systematically compared studies using ENTREQ criteria	<u>Barriers:</u> 1) Lack of awareness 2) Symptom-driven testing 3) Fear of cancer, screening results and treatment 4) Fatalism 5) Negative attitudes towards CRC screening tests 6) Embarrassment 7) Questioning test efficacy 8) Other health concerns 9) Competing life demands 10) Scheduling challenges 11) Natural remedies conquer CRC 12) Ethnic food protects from CRC 13) Wellness visits are not part of the culture 14) CRC screening tests are offensive to masculinity 15) Females perceived CRC as a male disease 16) Not possible to take time off 17) Transportation concerns 18) Low health literacy 19) Language barriers 20) Little public education about CRC 21) Lack of physician's recommendation 22) Friends, family, and kin negative experience 23) PCP inadequate explanation	Several factors play a role in people's attitude about CRC screening: 1) Lack of awareness of CRC 2) The roles of screening and its impact on the progression of the disease 3) People's motivation and attitudes in participating in CRC screening	V Research was supported through Cancer Care Ontario and Cancer Society Research Institute research awards

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Jones, Devers, Kuzel, & Woolf (2010)	This study aimed at understanding current perspectives on CRC screening	Downtown Richmond and Fairfax, and Front Royal, VA. Suburb of Washington, DC N = 427 (65%) returned n = 317 (74%) answered open-ended barrier question Primary care patients, aged 45-75 Urban, suburban, and rural settings	Two-part, mixed method, qualitative and quantitative Survey responses were analyzed by two reviewers and coded quantitatively Focus group, audiotaped transcripts analyzed qualitatively	<u>Postal survey</u> - Health Assessment Survey - with specific question about “most important barriers” to CRC 65% -White 66% - Female 29% - non-High School graduates <u>Focus Groups</u> – audiotaped, seven gender, race specific groups, 40 participants, qualitative data 43% -African American 62% -Women 5% -Non- high school graduate	<u>Survey Results:</u> 1) Fear – 10.1% 2) Bowel prep –7.9% 3) Lack of knowledge -7.9% 4) Pain - 7.6% 5) No insurance/cost - 6% 6) Afraid of results - 5.4% 7) Fear of procedure - 4.4% 8) Time/inconvenient - 4.4% 9) Embarrassed/ modest – 4.1% 10) No symptoms – 4.1% 11) Discomfort - 3.5% 12) No provider advice – 1.6% <u>Focus Group Results:</u> 1) Lack of awareness 2) Lack of provider recommendation 3) Fear 4) Better to find out later 5) Fatalism 6) Lack of time 7) Lack of social support from family and close friends 8) Competing demands 9) Concern that some screening modalities are outdated <u>Rarely reported, new barriers:</u> 1) Do not understand what to do 2) Lack of time 3) Bowel prep distasteful 4) Embarrassing/ humiliating 5) Invasive 6) Painful/ discomfort 7) Cost 8) Taboo topic/Sexual abuse 9) Para-sexual issues 10) Offensive to masculinity	Psychological factors influence CRC screening behaviors Policy makers and clinicians need to be aware of the complex variation of barriers patients feel when designing interventions	VI Generalizability limitations - Sample systematically excluded people with other perspectives Half of focus group and 68% of respondents to open ended questions had been screened for CRC Focus group completed in 2005-2006, not including all screening test \$2 incentive, returned survey \$50 incentive, focus group

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence Comments
Jung, Holt, Ng, Sim, Lu, Le, Juon, Li, & Lee (2018)	<p>Examine barriers, facilitators, and strategies to increase CRC screening among Chinese and Korean American (Asian Americans)</p> <p>Explore non-cultural and cultural factors associated with obtaining fecal occult blood (FOBT) and colonoscopy</p>	<p>Metropolitan Washington, D. C.</p> <p>N = 120 (Chinese and Korean American)</p> <p>Participants aged 50-85, no history of CRC and lived in the US for at least one year</p> <p>Average age 62.9 years</p> <p>Average year of US residency – 19.3</p>	<p>Mixed method</p> <p>Health Belief Model</p> <p>Quantitative-Self-administered survey</p> <p>Qualitative – Semi-structured interviews and focus groups open-ended questions</p> <p>Non-probability sampling method</p> <p>Triangulation of quantitative and qualitative data informed the interpretation of findings.</p>	<p>Self-administered survey sent prior to focus group and interviews (agree, disagree, or not sure)</p> <p>Moderator guide used for interviews and focus groups</p> <p>12 focus groups –8 to 10 participants: -59 Chinese -61 Korean Americans</p> <p>17 key informant interviewees – audiotaped, transcribed, and translated to English</p> <p>Transcription and thematic analysis completed</p>	<p><u>Cultural Barriers:</u></p> <ol style="list-style-type: none"> 1) Language 2) Low health literacy 3) Children need to translate 4) Prevention not a priority 5) No doctor if asymptomatic 6) Fear of finding CRC 7) Fatalism 8) Self-care 9) Stigma towards cancer 10) CRC Western disease 11) High pain tolerance 12) Use of CAM instead of western medicine 13) Lack of emphasis on preventive healthcare [Chinese] 14) Lack of exposure to American media <p><u>Non-Cultural Barriers:</u></p> <ol style="list-style-type: none"> 1) Lack of time/busy schedules 2) Lack of transportation 3) Complex healthcare system 4) Lack of a one day examination as in China/Korea 5) Lack of awareness about CRC 6) Lack of knowledge about CRC and CRC screening 7) Invasiveness 8) Concerns about complications 9) Concerns related to anesthesia 10) Embarrassment [Koreans] 11) Concern unnecessary tests. 12) Concerns about high cost/not having insurance 13) Physicians' recommendation 15) No regular physician 16) Mistrust of physicians 	<p>The mixed-method approach enriched the information related to CRC screening behaviors in Chinese and Korean Americans</p> <p>Examining barriers and facilitators of a population that has never had a CRC has relevant findings for under-screened populations</p> <p>Participants reported having a colonoscopy lived in the US longer</p>	<p>VI</p> <p>Limitations: 1) Non-probability method was used to recruit for social and screening status which may limit the generalizability</p> <p>Public health involvement needed to address CRC screening disparities among the Chinese and Korean America</p>

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Katz, Young, Zimmer mann, Tatum, & Paskett (2018)	To determine if CRC screening barriers that are patient- reported vary depending on how they were identified during a phone interview	Ohio Ten primary care clinics – five clinics per group Study completed 2007-2013 <i>N</i> = 109 Ethnic- 67%- White 31%- Black 59%-Female 57.2 - Average age 79% - College Education 60% - Annual Household Income > 30,000 80% - Health Insurance	Mixed method Secondary analysis of data gathered as part of a clustered randomized controlled trial CRC screening assessed through chart review Assessment of CRC barriers was completed by the lay health advisor (LHA) during the telephone barrier phone call Assessment completed using a two- step method: 1) Open-ended questions 2)Participants asked barriers read from a list	Telephone counseling session to identify barriers <u>First level:</u> Clinic Environment – CRC screening brochures <u>Second level:</u> Physician evidence-based CRC screening guideline education <u>Third level:</u> <i>Step 1:</i> Personalized letter from the primary- care physician plus American Cancer Society CRC screening brochure <i>Step 2:</i> Telephone CRC screening barrier counseling by a (LHA) <i>Step 3:</i> In-person education session with a (LHA)	<u>Test related:</u> 1) Painful/ uncomfortable/fear of procedure 2) Embarrassed 3) Test (FOBT) is messy 4) Already had 5) Transportation 6) Tests are inaccurate 7) Would have to go to unfamiliar place 8) Test causes cancer <u>Knowledge and attitudes:</u> 1) Not a priority 2) Not necessary, no family history 3) Never thought about it 4) Age 5) Afraid I might have cancer 6) I do not know where to go get it done 7) Never heard of CRC screening <u>Financial concerns:</u> 1) Cost 2) No health insurance 3) Insurance does not cover/high deductible <u>Interpersonal:</u> 1) Doctor never recommended 2) Someone recommended not to have test	Findings suggest that the methodology used to collect CRC screening barriers can influence the number of barriers reported, however this does not impact the frequently reported CRC screening barriers	VI Method used to document the screening barriers may influence the content of the interventions Participants with higher education level reported more barriers Single participants reported fewer barriers than those that were married Not all participants were within CRC screening guidelines

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Kim (2018)	Examine barriers and facilitators among Filipino, Japanese, Chinese, and Korean Americans	<p>Systematic Review – 22 articles</p> <p>Five databases: OneSearch, Academic Search Complete, CINAHL, Psychology & Behavioral Sciences Collection, and American Psychological Association’s Psych Net</p> <p>Search terms: “colorectal cancer AND screening AND Chinese, Filipino, Korean, and Japanese American”</p>	<p>Systematic literature review</p> <p>Health Belief Model, theoretical framework</p> <p>Health Care Utilization Model – Predisposing characteristics</p>	Examine facilitators and barriers of Asian Americans	<p><u>Predisposing Characteristics:</u></p> <ol style="list-style-type: none"> 1) Income level 2) No health problems 3) No symptoms of CRC 4) English proficiency 5) Low US acculturation level 6) Fatalism 7) Eastern form of treatment 8) Taboo discussing body parts 9) Having health insurance <p><u>Psychological Constructs:</u></p> <ol style="list-style-type: none"> 1) CRC Perceived susceptibility 2) Unaware of CRC screening tests 3) Lack of confidence in completing screening 4) Perceived seriousness of CRC 5) Fear/worry of positive results 6) Embarrassment/helplessness 7) Pain/discomfort of screening <p><u>Cues to action:</u></p> <ol style="list-style-type: none"> 1) Physician recommendation 2) Patient-provider communication 3) Emotional support from friends 4) Access <p><u>Barriers of Providers:</u></p> <ol style="list-style-type: none"> 1) Time 2) Interdisciplinary team to support provider with discussion regarding CRC screening 	<p>The nature of different cultures can be complex and multifaceted which can play an integral part in determining the appropriate intervention for CRC screening</p> <p>The quality of the patient-provider encounter should be evaluated as facilitator to CRC screening</p> <p>Education on Western culture preventive screening</p>	<p>V</p> <p>Limitations:</p> <ol style="list-style-type: none"> 1) Other studies not included due to literature search strategies 2) Majority of studies were cross-sectional 3) Self-reported questionnaire

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Kimura, Sin, Spigner, Tran, & Tu (2014)	Identify barriers and address facilitators to promote CRC screening in Vietnamese Americans	Seattle, Washington FQHC patients of Vietnamese descent <i>N</i> = 19 Participants: 50-79 years	Qualitative Convenience and snowball sampling Thematic analysis of barriers and facilitators	Focus groups – three Semi-structured focus group guide, audio recorded Inductive and iterative process for qualitative analysis	Barriers: 1) No symptoms/problems 2) Having comorbidities, especially diabetes 3) Challenges with medical terminology 4) Colonoscopy prep 5) Risk of perforation 6) Heard about a bad experience 7) Lack of knowledge about CRC screening 8) Lack of provider recommendation 9) Lack of social networks	Develop: 1) Educational program to improve CRC screening knowledge 2) Program that involves family members to serve as motivators for CRC screening 3) Protocol to assist patients with diabetes to safely complete the colonoscopy prep	VI Limitations: 1) Self-reported screening status 2) Males under represented 3) Interpreters used to translate from Vietnamese to English Participants received \$20 gift card

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Knight, Kanotra, Siameh, Jones, Thompson, & Thomas-Cox (2015)	Identify existing barriers in CRC screening to assist with implementation of interventions to address those barriers	Kentucky $N = 2,283$ Participants: ≥ 50 years, never completed Sigmoidoscopy or colonoscopy	Quantitative Correlational study Iterative proportional fitting 19 reasons for barriers placed into four categories Rank weightings stratified by race/ethnicity, sex, education, income, and health insurance coverage	Telephone health survey Kentucky Behavioral Risk Factor Surveillance System (KyBRFSS) survey – question related to CRC barriers was added to address respondents who never completed sigmoidoscopy or colonoscopy	<u>Attitude and Beliefs:</u> 1) No symptoms/family history of CRC/test not needed 2) Does not want the test 3) Has not thought about test 4) Fear test pain/ uncomfortable 5) No time 6) Postponed/too lazy 7) Embarrassing 8) Afraid of finding 9) Too old 10) Too young 11) Test does not work/not effective <u>Health Care Provider/System:</u> 1) Provider did not recommend/never said test was needed 2) No facilities/provider nearby/inconvenient to travel required distance to testing facility 3) Not sure where to go for testing <u>Cost:</u> 1) Cost of test/not covered by insurance 2) Transportation issues/ none, too difficult to find 3) No regular provider/does not go to the doctor Barrier	In 2015, Kentucky passed a bill that no longer imposed a deductible or co-pay for patients who had a screening colonoscopy that resulted in polyp removal or positive FIT/FOBT that required a follow-up colonoscopy. Interventions need to address populations and common barriers. Effective interventions should have a combined approach to address multiple barriers	VI Limitation of the study: 1) Did not discuss FIT/FOBT testing 2) Did not compare barriers with type of CRC screening 3) Cognitive testing for participant's comprehension was not completed on question added to the survey

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Muthukrishna, Arnolda, Aimee, & James (2019)	Describe self-identified barriers to CRC screening in federally qualified health center (FQHC) patients and determine if there is an association of barriers to socio-economic challenges	St. Louis and rural Southeastern Missouri Eleven urban and rural FQHC settings, Two health systems N = 198 57 - Mean age 66.5% - African Americans 74.2% - Income below poverty level 31.2% - Non high school graduates 68.5% - Unemployed /disabled	Quantitative Correlational study Secondary cross-sectional analysis using baseline data from the broader cluster-randomized trial Inductive and deductive reasoning used to organize responses into topics, then into codes Multiple responses double coded	Paper-based surveys administered by phone or mail Barriers assessed in open-ended questions Basic text analysis – data coded and organized into key topics English and Spanish speaking adults, age ≥ 50	<u>Barriers:</u> 1) Fear – 29.5% 2) Financial difficulties – 25% 3) Logistical challenges with screening – 19.1% 4) CRC screening a low priority – 15.8% 5) Discomfort or disgust with procedure – 11.52% 6) Bowel prep – 6.6% 7) No recommendation/referral 8) Unnecessary 9) Discomfort/disgust with procedure 10) Discomfort/disgust with prep 11) Medical mistrust 12) Lack of information on CRC screening 13) Religious reasons 14) Did not want test 15) Fear of sedation (allergic reaction)	Findings-applied to develop interventions and communication strategies to improve CRC screening in low income patients. Despite lack of insurance and cost barriers, fear the most common barrier in this population	VI Limitations: 1) Secondary analysis 2) Sample size limited 3) Undetermined if generalizable due to specific population Participants given \$20 gift card as incentive

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Nagelhout, Comarell, Samadder, & Wu (2017)	Identify differences in the support of barriers to CRC screening. Examine the relationship between provider recommendations and CRC screening adherence among White, Hispanic, and Pacific Islanders	Intermountain West Safety-net clinic that provides free medical services <i>N</i> = 197 (response rate of 26%) Age: 50-75 years old and had an appointment at the clinic 48% - Hispanic 24% - White 10% - Pacific Islander 4% - Black 13% - Other 58 years - Participant average age 58% - Female	Quantitative Correlational study Cross sectional survey Logistic regression used to evaluate the relationship between patient demographics, receiving provider recommendations, and patient awareness of CRC screening	Paper-based survey Self-reported questionnaire to identify barriers, occurrence of provider recommendation, and awareness of CRC screening Questionnaire modified to address low health literacy (lack of knowledge) Survey offered in Spanish and English 50% - English 50% - Spanish	<u>Barriers:</u> 1) Fear of test results- 28% 2) Cannot afford to leave work for appointment – 27% 3) Being unaware of the need for CRC screening – 25% 4) Lack of provider recommendation – 25% 5) Lack of trust in provider 6) Not having had a family member who has had CRC 7) Cannot afford to leave work for appointment 8) Finding the test embarrassing <u>Most Common Barrier by Racial/Ethnic Group:</u> <u>Hispanics:</u> 1) Lack of trust in their provider - (51%) 2) Not enough time – 45% 3) Fear of test results – 45% <u>Pacific Islander:</u> 1) Not having a family member who has had CRC - (34%) 2) Being unaware of the need for CRC screening – 33% 3) Cannot afford to leave work for appointment – 32% <u>White:</u> 1) Not having had a family member who has had CRC – 43% 2) Lack of provider recommendation – 37% 3) Finding the test embarrassing – 35%	Minorities had suboptimal completion for CRC screening for both colonoscopy and fecal stool blood test “Hispanic patients were less likely to report having a provider discuss CRC screening options compared to White patients” (<i>p</i> < 0.05) Race/ethnicity was a predictor of the receipt of a provider recommendation for CRC screening	VI Limitations: 1) Small sample size 2) Low response rate 3) Self-report for CRC screening completion and provider recommendation 4) Language barrier Participants reported ever receiving a provider recommendation for CRC screening – 16% Colonoscopy was the most discussed screening option (75%)

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Seibert, Hanchate, Berz, & Schroy (2017)	Study identified the following in obese adults nationally; prevalence of adherence to CRC screening, trends in screening strategies, obesity-specific barriers	US Civilian, non-institutionalized population N = 8,550 64% - White, NH 17% - Black, NH 14% - Hispanic 5% - Other 2010 National Health Interview with the Cancer Control supplement, no history of CRC, Body Mass Index (BMI) > 18.5	Quantitative Correlational study Cross-sectional study Multivariable logistic regression model of data analysis Stratified, multistage cluster design with oversampling so it can be generalizable	Face-to-face, 2010 National Health Interview Survey Pre-scripted NHIS answer options related to barrier question Cancer Control supplement is included every 5 years, random selection	<u>Barriers:</u> 1) Lack of awareness/need for screening 2) Provider recommendation 3) No symptoms 4) Put it off/ did not get around to it 5) Too expensive/ no insurance/ cost 6) Too painful 7) Too embarrassing 8) Do not have a doctor	Addressing unique screening barriers in obese adults could lessen disparities in the obese population and promote screening uptake Obesity epidemic increases the importance of CRC screening to prevent morbidity and mortality of the disease in this population	VI Limitations: 1) Self-reported data may cause over-reporting 2) Cross-sectional design limits inferences 3) Responses to barriers were provided, no open question option

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Tsoh, Tong, Sy, Stewart, Gildengorin, & Nguyen (2018)	This study examined CRC screening intention and how these correlate to Filipino, Hmong, and Korean American adults who have not completed the appropriate CRC screening	115 - Filipino - (Hawaii) 185-Hmong - (Sacramento, CA) 204 -Korean (Los Angeles, CA) N = 504 Participant age 50-75 years Study: August 2012 - January 2015 Spoke English, Philippine languages (Ilokano and Tagalog), Hmong, or Korean No history of CRC.	Quantitative Correlational study Cross-sectional, pre-intervention survey data form multisite randomized, cluster controlled trial	Adapted California Health Interview Surveys were paper- based, self-administered for Filipino and Koreans Project staff face-to-face, administered the survey to the Hmong in both English and Hmong to due to low writing literacy Examined four domains: 1) Socio-demographics 2) Health care factors 3) Perceived need for CRC screening 4) Knowledge of CRC screening	<u>Barriers:</u> 1) Lack of awareness – 61.3% 2) Lack of knowledge of CRC screening starts at age 50 – 71.8% 3) Lack of awareness that CRC screening prevention for CRC, <50% 3) Health care provider recommendation 4) Fear of CRC 5) Fear of getting CRC due to screening modality 6) Low income 7) Lack of ethnic provider 8) Cultural beliefs about preventative services	One in four participants stated they had intentions to complete CRC screening Interventions designed to increase knowledge of CRC screening guidelines may be effective strategies to increase CRC screening intentions. Further research needs to be completed in the Hmong community to discuss the importance of preventative health	VI Limitations of the study: 1) Immigrants who were enrolled in an educational trial 2) 73% saw a doctor in the past 12 months 3) Cross-sectional data did not discuss the causation of factors that led to changes of intention for CRC screening 4) High percentage of participants had prior CRC screening. Hmong – 50.3% Filipino – 36.5% Korean – 17.2% Participants received \$20

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Wang, Qiu, Gregg, Chen, Kim, Young, Wan, & Chen (2018)	To examine barriers and facilitators related to multiple levels that can impact CRC screening in a rural Accountable Care Organization (ACO) and how that can inform effective interventions	Remote rural and rural Nebraska, 77 counties Eight Primary Care Clinics from an ACO Patient participants, $N = 15,866$ Primary care providers, $N = 56$ Study dates: June 2014 – May 2015 Participants aged 50-75 years old,	Mixed method Data sources: 1) Patient - EMR 2) Provider - Provider survey and ACO administration 3) County socioeconomic and medical resource indicators - Secondary data obtained from Area Health Resource Files	<u>Outcome variable:</u> Patients up to date on CRC screening <u>Independent variables:</u> <i>Patient demographics</i> 1) Age 2) Race 3) Insurance 4) Language 5) Insurance 6) Last physical 7) Chronic condition 8) Travel time to clinic 9) Rural/urban <i>Provide characteristics:</i> 1) Gender 2) Race 3) Credentials 4) Year in practice 5) Patient visits 6) Perform colonoscopy 7) Protocol/reminder system for CRC screening 8) Review CRC performance	<u>Bivariate analysis results:</u> 1) 50-64 – 52% 2) ≥ 65 – 61.7% 3) Language – English -56.6%, Other – 32.6% 4) Physical in past 12 months – 71.1% 5) Chronic condition – none – 43.4%, ≥ 1 – 58.1% 6) Travel time to clinic - < 30 minutes – 54.9%, ≥ 30 minutes – 55.9% 7) Residence – urban – 55.3%, rural – 54.8% 8) County characteristics – Non-Hispanic white population - < 85% - 50.4%, $\geq 85\%$ - 57% <u>Barriers:</u> 1) Non-Hispanic Black 2) Hispanic 3) Non-English speaking 4) Uninsured 5) No Gastroenterologist in the county 6) County uninsured rate	Future efforts should focus on: 1) Age range from 50-65 2) Minorities 3) English language barriers 4) Encourage patients to have routine preventative visits in Primary Care Clinics Each clinic has a physician to perform colonoscopy or located in a town with the capabilities to perform a colonoscopy	VI Limitation of the study were: 1) Patients from a rural ACO, not generalizable 2) Provider survey rate high, but non-MDs were less likely to respond 3) Patient fear and embarrassment and perceived financial burden were not addressed in the EMR data.

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/Com ments
Wang, Roy, Kim, Farazi, P. Siahpush, & Su (2019)	Systematic review of articles that identify screening barriers in rural population in US so interventions could be implemented to improve CRC screening	Rural US 83 articles Two authors, independently reviewed abstracts of full-text articles	Systematic review Two authors independently reviewed the articles from the literature search and discussed Two authors discussed and came to an agreement about whether each article met the inclusion criteria Empirical studies, examining the factors related to CRC screening or perceived barriers for a rural population in the US, inclusion criteria	Articles categorized into three study methodologies: 1) Focus groups/ interviews for perceived barriers 2) Survey patients on perceived barriers 3) Electronic Health Record data in rural areas.	<u>Structural barriers:</u> 1) High cost of procedure 2) Lack of insurance 3) Lack of time <u>Barriers related to screening procedure:</u> 1) Embarrassment or discomfort 2) Fear of test 3) Fear of finding cancer 4) Fear of burdening family <u>Individual barriers:</u> 1) Lack of knowledge 2) Lack of perceived need with no symptoms 3) Misperception is a male disease <u>Provider-level barriers:</u> 1) Lack of provider recommendation 2) Distrust of providers 3) Inadequate access to specialists <u>Rural-specific:</u> 1) Lack of prevention attitude 2) Lack of privacy due to knowing the medical staff 3) Lack of close clinic or screening facility 4) Transportation to screening facilities 5) Lack of provider recommendation due to cost of screening 6) High cost of screening	In this study major barriers identified in rural populations were not different than barriers identified in urban populations	V Factors specific to rural areas need to be included when identifying effective strategies for rural populations related to increased CRC screening.

Citation	Purpose	Sample/ Setting	Design/ Framework	Variables/ Instruments	Results	Implications	**Level of Evidence/ Comments
Wilkins, Gillies, Harbuck, Garren, Looney, & Schade (2012)	Examine barriers to CRC screening in rural populations	Two Georgian counties, McDuffie and Screven <i>N</i> = 635 participants (34.5% acceptance rate) Average age – 62.2 years 72.4% - women <u>Participant's ethnicity:</u> 79.4 % - White 19.5% - African American 64.2% - married 20% - some high school or less 40% - high school graduate	Qualitative Modified Health Belief Model Random selection Contacted county residents by phone using a published list Statistical analysis completed for demographic information, CRC knowledge, and perceived barriers	Telephone survey <u>Psychometric properties:</u> 1) Benefit items for all screening test, <i>n</i> =5 2) Barrier items for all screening tests, <i>n</i> =6 3) Barrier items specific FOBT, <i>n</i> =3 4) Barrier items specific to flexible sigmoidoscopy and colonoscopy, <i>n</i> =3 5) Barrier items for colonoscopy alone, <i>n</i> =2 Perceived worry and risk were asked with single questions	<u>General Perceived Barriers:</u> 1) CRC screening not needed, no symptoms, (<i>p</i> < 0.001) 2) Physician spent enough time, (<i>p</i> < 0.001) 3) CRC screening cost is high, (<i>p</i> < 0.001) 4) Embarrassing, (<i>p</i> = 0.033) 5) Afraid complications, (<i>p</i> < 0.001) 6) Insufficient time for CRC screening, (<i>p</i> < 0.001) FOBT Barriers: 1) Do not know how to perform FOBT 2) Collecting a sample for FOBT is unpleasant 3) I do not have privacy to collect sample for FOBT <u>Flexible Sigmoidoscopy/ Colonoscopy Barriers:</u> 1) Too painful 2) Anxious because do not really understand what is done 3) Following special diet or taking laxative, enema <u>Specific colonoscopy:</u> 1) I am afraid of possible bleeding or tearing of colon 2) I will have transportation problems (need someone to drive <u>General:</u> 1) Find CRC early - save my life 2) If you find CRC early, it is not as bad 3) Need to find CRC early	Most important factor in CRC screening completion is a recommendation from a personal physician, especially important for African American patients African American are more likely to be screened with FOBT than sigmoidoscopy or colonoscopy Use of computer- based tool to assist providers in identifying patients not up to date/high risk for CRC screening	VI <u>Selection bias:</u> – high rate of CRC screening com- pleted; partici- pants more willing to complete survey <u>Limitation of study:</u> 1) Self- reported data 2) No health literacy assessment 3) Sample more women and whites

APPENDIX C

**Type/Levels of Evidence

Level I: Evidence from a systematic review or meta-analysis of all relevant RCTs (randomized controlled trial) or evidence-based clinical practice guidelines based on systematic reviews of RCTs or three or more RCTs of good quality that have similar results.

Level II: Evidence obtained from at least one well-designed RCT (e.g. large multi-site RCT).

Level III: Evidence obtained from well-designed controlled trials without randomization (i.e. quasi-experimental).

Level IV: Evidence from well-designed case-control or cohort studies.

Level V: Evidence from systematic reviews of descriptive and qualitative studies (meta-synthesis)

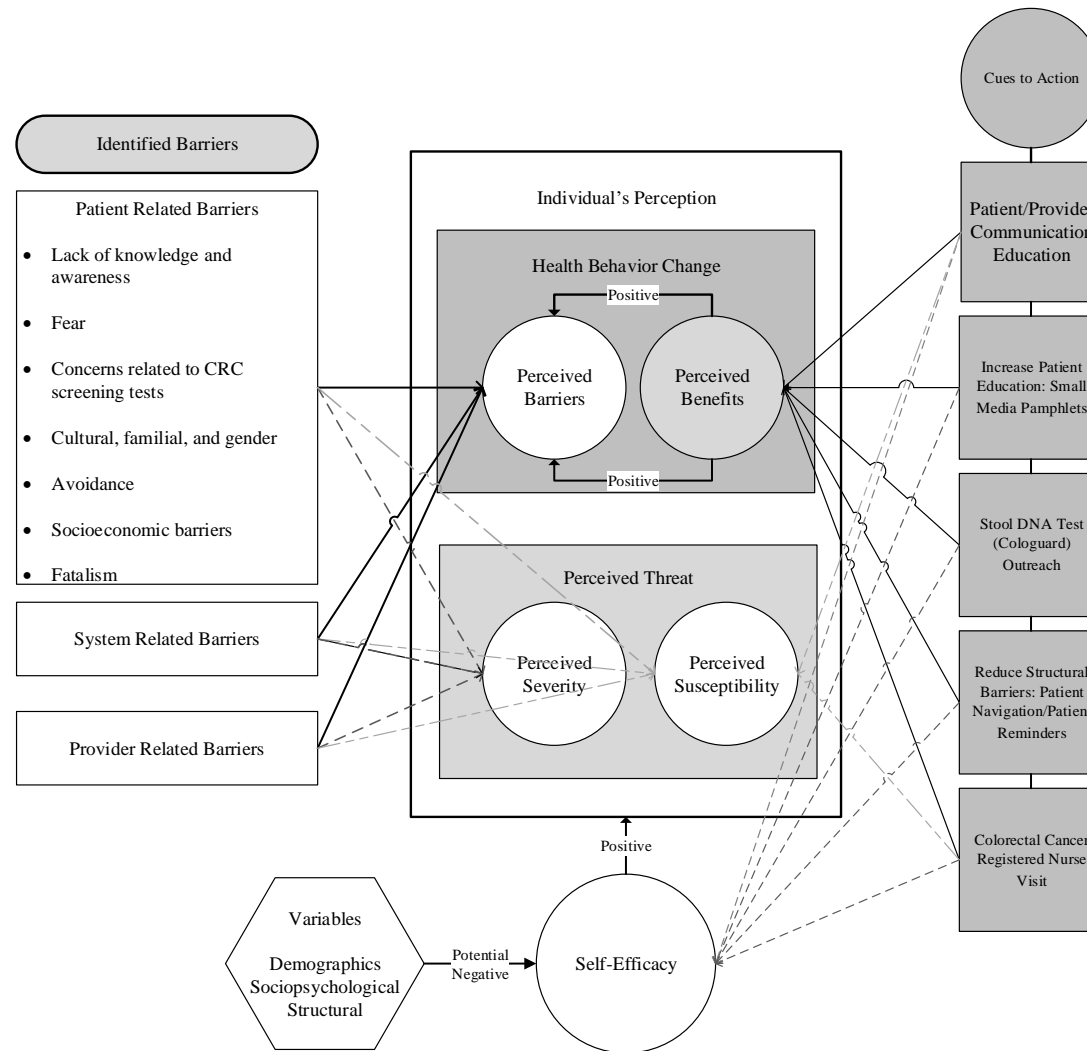
Level VI: Evidence from a single descriptive or qualitative study.

Level VII: Evidence from the opinion of authorities and/or reports of expert committees.

This level of effectiveness rating scheme is based on: Ackley, B. J., Swan, B. A., Ladwig, G., & Tucker, S. (2008). *Evidence-based nursing care guidelines: Medical-surgical interventions*. (p. 7). St. Louis, MO: Mosby Elsevier.

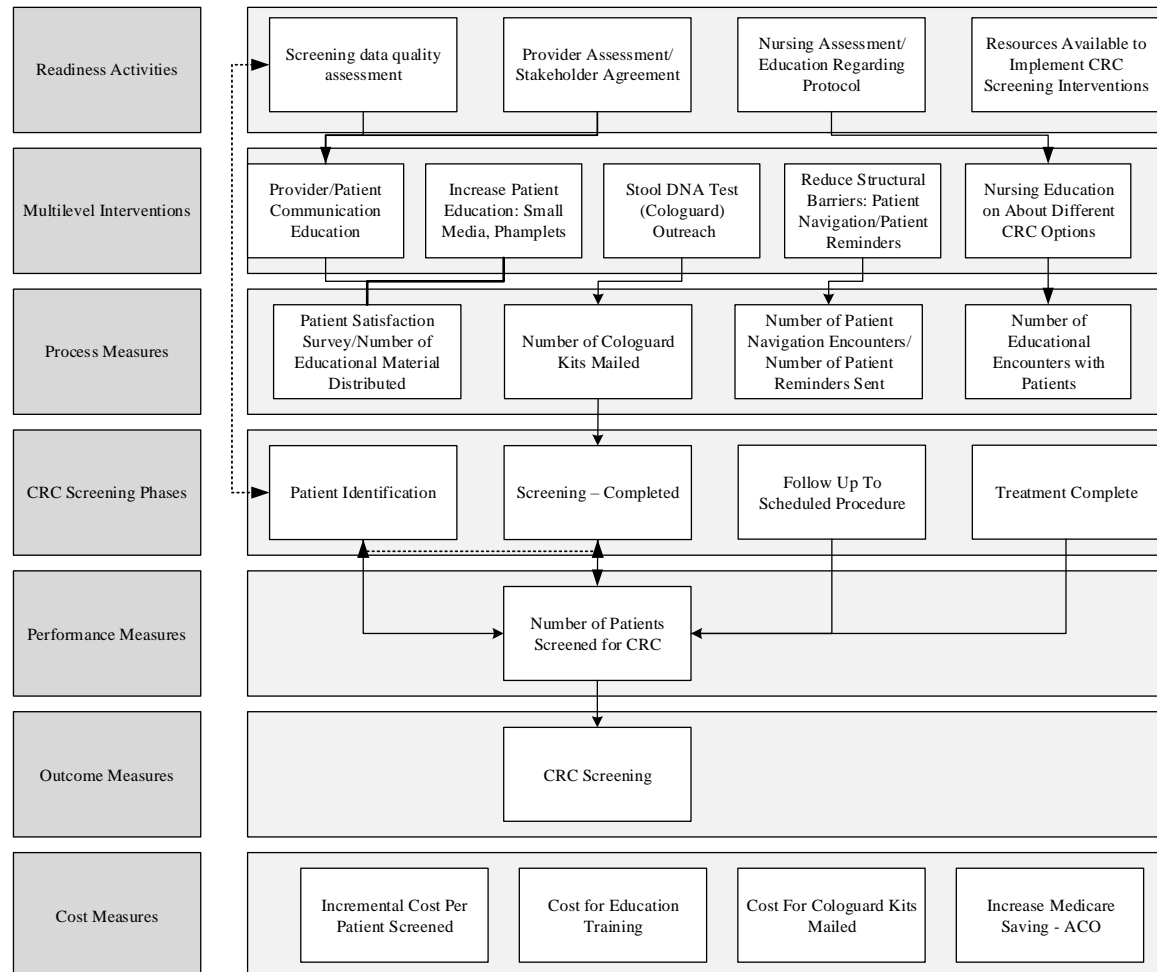
APPENDIX D

Concept Map Applying Individual Barriers to Colorectal Cancer Screening and the Health Belief Model



APPENDIX E

Framework for Implementing Multicomponent Colorectal Cancer Screening Interventions



Note. Framework for implementing multicomponent colorectal cancer screening interventions adapted from Subramanian et al. (2018). Figure 1. with permission.

APPENDIX F

Primary Care Colorectal Cancer Education RN Visit Guide

<p align="center">Primary Care Colorectal Cancer Registered Nurse Education Visit Guide</p> <p align="center">The nurse visit guide is designed to provide resources and tools to help you prepare for the nurse visit.</p>	
Knowledge	<p>Up To Date</p> <ul style="list-style-type: none"> • <u>Clinical Use of Colorectal Cancer Screening Tests</u> • <u>Stool-Based Tests</u> • <u>Endoscopic Visualization</u> <p>U.S. Preventative Services Task Force (USPSTF)</p> <ul style="list-style-type: none"> • <u>Colorectal Cancer Screening</u>
Visit	<p>Appointment Review:</p> <ul style="list-style-type: none"> • Review Plan of Care • Review prescribed medications • Review BPAs if appropriate and/or time allows <p>Visit:</p> <ul style="list-style-type: none"> • Investigate patients fears and concerns • Discuss the prevalence of CRC • Discuss the benefits and harm of CRC • Discuss reasons patient personally needs screening • Inform patients of steps and expectations involved in CRC screening ordered • Discuss how to care for yourself before and after the screening • Talk about the pros and cons of each test • Instruct the patient on how to determine what insurance will cover • Discuss what successful, early treatment looks like • Discuss CRC screening survival rates • Address system related barriers, self-perceived fear, socioeconomic barriers, and fatalism as appropriate • Complete the RN Checklist for Colorectal Cancer Screening (Jones, Devers, Kuzel, & Woolf , 2010)
Patient Education	<ul style="list-style-type: none"> • <u>Patient education: Colon and rectal cancer (The Basics)</u> • <u>Patient education: Colon and rectal cancer screening (The Basics)</u> • <u>Patient education: Colonoscopy (The Basics)</u> • <u>Patient education: Colon polyps (The Basics)</u>
Documentation	<ul style="list-style-type: none"> • Document Colorectal Cancer Education visit – include barrier, pertinent information related to visit, and amount of education time • Document visit patient education provided

Based on chart assessment and information EHR which testing is most appropriate for this patient?

FIT FOBT Cologuard Flex Sigmoidoscopy Colonoscopy

Pend order and/or bowel preparation or other medications to primary care provider

Patient Education Material: Print for patient or add to electronic health record

Center for Disease Control

[Colorectal Cancer Screening](#)

[Screening Test At- A-Glance](#)

[Risk Factors & Symptoms: Colorectal Cancer Screening Saves Lives](#)

Website for Patient Education in Korean:

<http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/ml-korean>

Website for Patient Education in Filipino:

<https://www.youtube.com/watch?v=PfJ4GpkqtSU>

Website for Patient Education in Spanish:

<http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/ml-spanish>

Website for Patient Education in Vietnamese:

<http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/ml-vietnamese>

Website for Patient Education in Other Languages:

<http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/in-your-language>

<https://medlineplus.gov/languages/colorectalcancer.html>