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Publication Date

2015-02-01

DOI

10.1016/j.ypm.2014.11.022

Peer reviewed



Published in final edited form as:

Prev Med. 2015 February ; 0: 40–48. doi:10.1016/j.ypmed.2014.11.022.

EXPLAINING PERSISTENT UNDER-USE OF COLONOSCOPIC CANCER SCREENING IN AFRICAN AMERICANS: A SYSTEMATIC REVIEW

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Abstract

Introduction—Although African Americans have the highest incidence and mortality from colorectal cancer (CRC), they are less likely than other racial groups to undergo CRC screening. Previous research has identified barriers to CRC screening among African Americans. However we lack a systematic review that synthesizes contributing factors and informs interventions to address persistent disparities.

Methods—We conducted a systematic review to evaluate barriers to colonoscopic CRC screening in African Americans. We developed a conceptual model to summarize the patient-, provider-, and system-level barriers and suggest strategies to address these barriers.

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Martijn van Oijen: Study concept and design, analysis and interpretation of data, conceptual model, drafting of the manuscript, critical revision of the manuscript for important intellectual content, and study supervision.

Potential competing interests: The authors have no competing interests to disclose.

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Results—Nineteen studies met inclusion criteria. Patient barriers to colonoscopy included fear, poor knowledge of CRC risk, and low perceived benefit of colonoscopy. Provider-level factors included failure to recommend screening and knowledge deficits about guidelines and barriers to screening. System barriers included financial obstacles, lack of insurance and access to care, and intermittent primary care visits.

Conclusions—There are modifiable barriers to colonoscopic CRC screening among African Americans. Future interventions should confront patient fear, patient and physician knowledge about barriers, and access to healthcare services. As the Affordable Care Act aims to improve uptake of preventive services, focused interventions to increase CRC screening in African Americans are essential and timely.

Keywords

Barriers; colorectal cancer; screening; colonoscopy; race; ethnicity; African-American

INTRODUCTION

African Americans have a higher incidence and mortality from colorectal cancer (CRC) than any other ethnic group in the United States (U.S).¹ Despite compelling evidence that CRC screening results in early cancer diagnosis and decreased CRC-related mortality in African Americans, African Americans are less likely to undergo appropriate CRC screening than Whites.^{2–5} In recent national estimates, 55% of African Americans, compared to 60% of White Americans were compliant with CRC screening⁵. Prompted by these disparities, as well as by data supporting a high prevalence of right-sided colonic lesions among African Americans, the American College of Gastroenterology (ACG) began recommending in 2009 that CRC screening begin at age 45 for African Americans, with colonoscopy as the preferred screening method.^{4, 6–8}

In a 2002 report on racial and ethnic inequities in healthcare, the Institute of Medicine (IOM) conceptualizes racial and ethnic disparities in health as the result of factors in patient-, provider-, and health care system-level domains.⁹ While prior studies have identified patient-, provider-, and system-level barriers to several screening methods (fecal occult blood testing [FOBT], sigmoidoscopy, and colonoscopy) in African Americans, the literature lacks a systematic and summative presentation of the barriers to screening in this ethnic subgroup.^{10–13} Further, although recent society guidelines emphasize colonoscopy as the preferred screening tool in African Americans, the barriers preventing African Americans from participating in this method of screening are not fully characterized. Given these gaps in the literature, we aimed to provide a systematic review of the literature pertaining to barriers to colonoscopic screening in African Americans. We use the three domains proposed by the IOM to develop a conceptual model that synthesizes the barriers to colonoscopic screening. The resulting conceptual framework provides clinicians, researchers, and healthcare organizations with potential strategies in the design of effective, system-wide interventions to increase the use of colonoscopic screening among African Americans and to reduce disparities in CRC outcomes.

METHODS

We conducted a search of the MEDLINE and the Cochrane Central Register of Controlled Trials (CENTRAL) databases with the guidance of an experienced biomedical librarian (L.F.). Keywords and Medical Subject Heading (MeSH) terms combined the concepts of “colorectal cancer,” “colonic polyps,” “colonoscopy,” “preventive health services,” “barriers to health care,” “health care disparities,” “African Americans,” and “minority groups” (Figure 1). We restricted our search to English language articles published between 1950 and November 2013. Included studies met the following criteria: 1) evaluated African Americans between 45 to 75 years old; 2) identified at least one patient-, provider-, or system-level barrier to uptake of screening colonoscopy in African Americans; and 3) conducted in the U.S. Exclusion criteria were: 1) reported barriers to non-colonoscopy screening methods only; 2) aggregated data and outcomes for multiple methods of screening; 2) did not report barrier results specific to African Americans; 3) study only included participants with conditions known to confer increased CRC risk.

Two independent reviewers (E.B. and F.M.) evaluated abstracts for the initial query results. A third party (M.v.O.) resolved any discrepancies between reviewers. The reviewers checked the references of the selected manuscripts by hand and reviewed any studies meeting inclusion criteria that had not been identified in the initial query. They included one additional study based on this manual search. The two reviewers then independently read each chosen manuscript and abstracted data regarding the study design, sample characteristics, sample size, percentage of African Americans, statistical methods, and barriers to colonoscopy identified, using a uniform data abstraction spreadsheet. The reviewers classified studies as “quantitative” if numeric data were generated by empirical statistical tests, standardized instruments and/or predetermined response categories and “qualitative” if data were text-based data and obtained by open-ended discussions, questions, and observations.¹⁴ To assess the quality of the qualitative interview and focus group studies, reviewers used the Consolidated criteria for reporting qualitative research (COREQ) to evaluate study quality. COREQ is a comprehensive 32-item checklist created to promote complete and accurate reporting of qualitative studies.¹⁵ For the included observational studies, reviewers used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines, a checklist of 22 items considered essential for accurate reporting of observational studies.¹⁶

Following the previously established IOM disparities framework, we defined barriers as influences hindering age-appropriate CRC screening by colonoscopy and categorized these into patient-, provider-, and system-related factors. Patient-level factors included patient preferences and demographic factors that influence whether screening is performed. Provider-related items were those factors specific to a provider’s practice that affect whether screening is performed. System-level barriers were those concerning access to services, organization of the healthcare system, and healthcare system financing.⁹ For each study that met inclusion and exclusion criteria, we listed the identified barriers to colonoscopy. We then created our conceptual framework by populating the three model domains with all the barriers to colonoscopic screening identified in our literature search. Using the resulting conceptual model as guidance, our team considered several patient, provider, and system

approaches to address barriers to colonoscopic screening, resulting in several suggested strategies for future interventions to address specific barriers and improve uptake of colonoscopic CRC screening.

RESULTS

We identified 468 abstracts in our initial query. Of these, we selected 162 for full-text review and ultimately included 19 publications in the final manuscript (Figure 2). We were unable to locate the full text of one article through the access of two university libraries.¹⁷ Tables 1 and 2 summarize the subject population, study design, and findings of the included studies. The majority of studies included low-income subjects from Community Health Centers or primary care facilities in urban areas of the U.S. Study samples were mutually exclusive with the exception of the two Winterich studies. For the 8 included qualitative studies, the range of reported COREQ items was 16 to 25 items out of 32 with a mean of 19 items. For the 11 observational studies, the range of completed STROBE checklist items was 16 to 21 items out of 22 with a mean of 17 items. A total of 17 studies evaluated patient-level factors, 11 studies evaluated provider-level factors, and 7 studies evaluated system-level factors (Figure 3).

Figure 4 illustrates our resulting conceptual model for utilization of CRC screening colonoscopy in African Americans. While we identified several additional demographic barriers to screening such as patient income, education, and age, our model includes only barriers that are salient to African Americans and colonoscopy and that are most modifiable by public health or healthcare interventions. Below, we review the specific barriers identified within the patient-, provider-, and system-level domains.

I. Patient Factors

Patient barriers among African Americans included fear, poor knowledge of CRC risk, poor knowledge about screening, low perceived benefit of colonoscopy, absence of symptoms, low education, cancer fatalism, and other patient-specific barriers to colonoscopy.^{18–26}

Fear—Fear was the most prevalent barrier to receiving colonoscopic screening among African Americans (cited in 11 studies). Studies reported several types of patient fear: 1) fear of pain during colonoscopy; 2) fear of invasion during colonoscopy; 3) fear of bowel preparation; 4) fear of sedation or of hospital setting; and 5) fear of receiving a cancer diagnosis.^{18–22, 24–25, 27–28, 30–32} Fear of perceived “invasion” during colonoscopy was a common theme among African American males in particular.^{18–21, 24, 27–28, 30} Male respondents in focus groups and cognitive interviews described colonoscopy as “offensiveness,” “violating,” and “treading on my masculinity.”^{18, 24, 27} Cancer-related fear stemmed from concerns about being diagnosed with cancer^{19, 21, 25, 28, 30} and of cancer treatment.¹⁹ Participants described fear of “prolonged illness” and an inability to be cured.¹⁹ In contrast, those who believed that the benefits of cancer screening outweighed the risks of being diagnosed with cancer were more likely to undergo screening.^{28–30} Compared to patients who had never been screened, patients who had undergone colonoscopy were less fearful of repeating the procedure and were more likely to prefer colonoscopy to other methods of screening in the future.^{20, 28} These findings suggest that future interventions

should employ peer support and community education to help allay patient fears of screening with colonoscopy. This will require a meticulous understanding of the knowledge, attitudes, and beliefs about colonoscopy and CRC, and creation of evidence-based, tailored interventions that directly and responsibly address maladaptive cognitions that undermine receipt of colonoscopy.

Knowledge and Perceived Susceptibility—Knowledge barriers to colonoscopy uptake included low perceived risk of CRC, lack of understanding of screening, and low perceived benefit to CRC screening.^{19, 21–22, 26, 28,30,31,33} African Americans were often not aware of their increased risk of CRC.^{21, 30, 33} For example, in one survey of 76 African American participants, only 16% believed that African Americans had a higher risk of CRC than Whites, and only 53% believed that CRC was preventable.³³ Moreover, in one telephone interview study of 635 Georgia residents, African American participants reported absence of symptoms as the main reason that screening was “unnecessary”.^{21, 31} As a potential explanation for these knowledge deficits, participants in qualitative studies perceived that the benefits of CRC screening were not publicized as widely as breast and prostate cancer in their communities.^{21, 28} Similarly, one study found that Whites were more likely than African Americans to recognize the media attention around Katie Couric’s colonoscopy in 2000.²¹

These findings suggest that enhancing patient knowledge about colonoscopy may improve uptake rates among African Americans. For example, one study found that African Americans who completed screening advocated for education strategies to implore others to do the same.²⁸ Screened patients suggested educating the African American community through strategies such as wellness vans, empowering community organizations with knowledge, and using influential individuals as advocates. While the data supporting community- and peer-based education is limited in CRC, the Community Preventive Services Task Force emphasizes the benefits of such methods for other malignancies and suggests further investigation in CRC.²⁹

Other Patient-Level Barriers—The existing literature demonstrates that competing factors such as personal or financial obligations,³⁰ life stressors,³⁰ an inability to find transportation,^{21, 25, 30, 34} and concern about other more pressing illness or comorbidity³⁵ also present barriers to colonoscopic screening.

Patient Factors: Barriers and Future Strategies

- The prevailing patient-level barriers to receiving screening colonoscopy are fear, sub-optimal knowledge about CRC and colonoscopy, and competing factors.
- Future interventions should:
 - Create evidence-based educational tools that improve knowledge of CRC risk and emphasize the benefits of screening.
 - Explore ways in which peer support and community education can allay patient fears about colonoscopy and about cancer diagnosis.

- Implement assistance programs and ancillary provider liaison programs to reduce logistical conflicts to obtaining colonoscopy.

II. Provider Factors

We identified provider-level barriers to screening including lack of provider recommendation for colonoscopy,^{21, 26, 28,30–31} insufficient patient counseling about screening,^{19, 22, 28} poor knowledge of updated CRC screening guidelines in African Americans,³⁶ lack of provider recognition of barriers,^{10, 25} and long wait times at the primary medical doctor's office.¹⁹

Provider Knowledge—In a cross-sectional survey of 512 physicians in 2012, only 28% of physicians identified 45 years as the age to initiate colonoscopic screening in African Americans.³⁶ African American physicians were more likely than their non-African American counterparts to report this 45 year old screening threshold (66.7% vs. 27.8%; $p=0.01$). In two survey studies of internal medicine resident physicians at an urban, academic medical center, physicians were unaware of previously identified barriers to colonoscopy screening among African Americans (access to care, cost, and medical mistrust), and barriers deemed important by their African American patients (multiple types of fear, embarrassment, and cancer fatalism).^{10, 25} Moreover, residents did not attribute importance to several facilitating factors that motivated their African American patients, including receiving a physician's recommendation for colonoscopy, removing pre-cancerous growths, and believing that the benefit of colonoscopy was "worth the effort".²⁵

Physician Counseling Practices—Lack of a physician recommendation is the most frequently reported provider barrier to colonoscopic screening in African Americans.^{21, 26, 28,30–31} The importance of a provider recommendation was demonstrated in several survey studies. One study demonstrated that lack of a physician recommendation strongly predicted lack of screening uptake.³¹ Two studies demonstrated a positive association between physician recommendation and colonoscopy completion, with rates as high as 88–92% among those receiving a physician endorsement.^{25, 34}

Another documented barrier is insufficient time for patient-provider communication to discuss colonoscopy. In interviews of 635 rural participants, African Americans were significantly more likely than Whites to believe that insufficient provider contact time served as a barrier to screening.²²

Given the importance of patient-provider communication, colorectal cancer screening guidelines should promote open discussion about patient knowledge and fears of screening. Future investigations should evaluate the most effective ways for providers to discuss screening with patients. Health systems should engage and empower patients in the process of creating strategies to enhance understanding of colonoscopy screening and to increase adherence to screening within the African American community.

Provider Factors: Barriers and Future Strategies

- The prevailing provider barriers to offering colonoscopy screening in African Americans are poor knowledge of current patient barriers, provider confusion regarding the age threshold for screening for African Americans, lack of recommendation for screening, and insufficient patient counseling.
- Future interventions should focus on:
 - Increasing provider knowledge of patient barriers to screening.
 - Consensus among national societies about age of initiation of screening in African Americans.
 - Developing models and tools that encourage shared decision-making about CRC screening between African American patients and their care providers.
 - Investigating both provider delivery of and patient comprehension of screening recommendations.

III. System Factors

Our review identified system-level barriers for performing screening colonoscopy in African Americans, including the cost of colonoscopy,^{21–22, 30, 34} inadequate health care insurance among many African Americans,^{19, 22, 30} fewer specialist referrals,^{21, 30} and fewer interactions with a primary care physician.³⁵

Financial Barriers—The direct financial costs of colonoscopy were widely expressed as barriers to screening in the studies identified by our review.^{19, 21–22, 30, 34} Procedural costs were prohibitive not only for patients who were uninsured, but also for insured patients in the form of insurance copays.³⁰

Lack of Insurance and Primary Care Provider Visits—Lack of insurance as a barrier to colonoscopy was reported in multiple studies.^{19, 21, 30} In addition, fewer PCP visits was a barrier to colonoscopic screening. As demonstrated in a cross-sectional study of 157 patients with a primary medical doctor at Mount Sinai Hospital in New York, a higher proportion of colonoscopies was completed in patients with three or more visits to their primary doctor within one year than in those with fewer than three visits.³⁵ This emphasizes the cornerstone position occupied by PCPs in preventive care strategies, in this case for appropriate CRC screening in African Americans.

The Affordable Care Act (ACA) provides an opportunity to reduce these barriers by providing improved access to care and eliminating copays for preventive services.³⁷ Future studies should investigate the effect of the ACA and Medicaid expansion on CRC screening uptake specifically in African Americans. Given a lack of consensus among the major medical societies on the recommended age of screening initiation in African Americans,

future efforts should also evaluate the effect that earlier screening has on both uptake of colonoscopy, as well as on morbidity and mortality from CRC in African Americans.

System Factors: Barriers and Future Strategies

- The prevailing system barriers to offering colonoscopy screening in African Americans are direct costs of screening, inadequate health insurance coverage, fewer PCP visits, and lower access to specialists.
- Future interventions should:
 - Investigate the effect of insurance provisions and preventive care coverage provided by the Affordable Care Act on colonoscopy uptake in African Americans.
 - Evaluate the impact of initiating screening at age 45 and of colonoscopic screening on both screening uptake and on morbidity and mortality from CRC in African Americans.

DISCUSSION

Disparities exist across the cancer control continuum in the US. Given its impact as the third most common malignancy in the US and the potential for its prevention, the American Cancer Society has identified increasing CRC screening as a priority for cancer prevention and control.³⁸ Despite United States Preventive Service Task Force (USPSTF) recommendations that all Americans aged 50–75 undergo screening for CRC and more recent recommendations by the ACG to screen African Americans with colonoscopy at age 45, African Americans face poor screening uptake.³⁹ In efforts to improve screening uptake, this systematic review identifies and categorizes patient-, provider-, and system-level barriers to colonoscopic CRC screening in African Americans.

We employ a conceptual model to elucidate barriers within each of these three domains, recognizing that each domain contributes individually to screening uptake while also interacting with the other domains. For example, an individual's knowledge about CRC risk or perceived susceptibility for disease may influence the number of primary care visits he attends. Further, poor access to gastroenterology specialists within a healthcare system may influence whether a provider recommends screening colonoscopy. It is the interaction between these patient, provider, and system contributors that underlie the complex nature of CRC screening disparities. We use this conceptual model to summarize the existing literature on barriers to colonoscopy and to suggest approaches to address barriers to screening colonoscopy in African Americans. Physicians, investigators, and healthcare organizations can employ these tools to help design and test targeted interventions to address the multifactorial barriers to screening.

A key theme in the literature is that unmitigated fear strongly undermines colonoscopic screening in African Americans; this is consistent with prior literature on screening for prostate and breast cancer. In prostate cancer, procedural fear and concerns of invasion are

more prominent among African American men than among women and non-African American men.^{19, 24, 27–28} African American men are more likely to report fear of invasion, discomfort, and an affront to their masculinity with digital rectal examination than White American men.^{40–42} With regard to fear of a cancer diagnosis, the breast cancer literature supports the conclusion that African American women are often deterred from mammographic screening because of concern for a breast cancer diagnosis.⁴³ In light of the pervasive deterrent role of fear among African Americans considering cancer screening, future interventions should focus on strategies to understand and confront this barrier. In addition, while an emphasis has been placed on colonoscopic screening in this ethnic subgroup, procedural resistance may imply a role of other screening modalities to overcome this barrier. Insistence on colonoscopy over other screening tests like FOBT or Fecal Immunochemical Testing (FIT) may only further promote disparities in screening.

Physician-level factors also negatively impact decision-making among African Americans contemplating screening. Failing to recommend CRC screening remains prevalent and is likely driven by factors that undermine adherence to other practice guidelines in medicine: physician knowledge, lack of outcome expectancy, lack of time and resources, and lack of reimbursement.^{44–46} With respect to recommending CRC screening in African Americans specifically, these factors are compounded by a lack of a consensus among medical societies about the appropriate age of initiation of CRC screening and method of screening. Moreover, studies indicate that when physicians are directly observed delivering information to patients, only a fraction of patients recall the recommendations.^{47–48} Future investigations should focus both on ensuring that providers appropriately recommend CRC screening to African Americans, and also evaluate whether patients fully comprehend and recall the recommendation once delivered. Efforts should be made to standardize screening recommendations across medical societies. A multi-modal intervention should also extend educational and awareness efforts beyond the clinic and into the community setting.

We also found that patient decisions depend on how CRC screening is offered. In a cross-sectional study of over 13,000 patients, Jones and colleagues found that when two or more screening options are presented, there is increased confusion and decreased adherence to CRC screening by any method in both White and African American patients.⁴⁹ However, in a 2012 randomized trial investigating adherence to CRC screening, Inadomi and colleagues demonstrated that the highest rates of CRC screening among African Americans were achieved when patients were counseled to undergo FOBT (56%) or were offered a choice between FOBT and colonoscopy (54%). The highest rates of colonoscopy, however, were achieved when this choice option was presented alone (34% in the colonoscopy arm vs. 20% in the choice arm).⁵⁰ Thus, the goal to improve screening by colonoscopy specifically, may be hindered by recommendations to engage in any type of screening. Future research must determine whether optimal physician counseling practices are to suggest colonoscopy alone or to provide a menu of screening options.

While the ACA offers promise in confronting system-level barriers, there remain uncertainties about its potential to eliminate disparities in CRC screening for African Americans. First, as the ACA mandates coverage for CRC screening according to United States Preventive Services Task Force (USPSTF) guidelines, the reform will not apply to

screening at age 45 in African Americans, as recommended by the ACG. Second, insurance coverage alone may not be sufficient to improve rates of screening colonoscopy. As a proxy for predicting the response to the ACA, investigators studied the impact of fee waivers on colonoscopies for members of the University of Texas health plan starting in 2009.⁵¹ The study demonstrated a limited but significant increase in colonoscopies by 1.5%, concluding that measures beyond elimination of financial barriers are needed to impact rates of colonoscopic screening in the U.S.⁵¹ Moreover, the preventive medicine literature reveals that when previously uninsured patients gain coverage, there is usually a delay before they use services at rates equal to continuously insured patients.⁵² It will be important to evaluate the effects of health care reform on screening colonoscopy in African Americans not only immediately after the expansion, but also over time.

The strengths of this systematic review include its focus on a high-risk and under-screened population and on colonoscopy as the preferred method of CRC screening in this population. As professional societies begin to consider tailored screening recommendations for African Americans, this information will help determine the feasibility of recommending colonoscopic screening over other modalities. Moreover, the included studies contain data on African Americans from a range of educational attainment levels, geographic regions, practice settings, and insurance statuses. While the quality of the studies varied, all studies reported a majority of the quality checklist criteria. Lastly, from the data collected, we were able to create the first conceptual model for barriers to colonoscopic screening among African Americans that synthesizes barriers from the literature, highlighting the unique challenges in this population.

The limitations of the study are similar to those of other systematic reviews. We relied on published literature only, which might result in publication bias. Moreover, it is difficult to prioritize future intervention efforts or to be certain that the proposed solutions will ultimately mitigate disparities in colorectal screening in African Americans. Further work in this area will be useful to determine which factors have the greatest impact on increasing uptake of colonoscopy. Third, as the majority of studies included African American subjects from low-income settings, our findings may not be representative of African Americans in higher socioeconomic standing. Fourth, while our intentions were to review and summarize facilitators and barriers to colonoscopic screening in African Americans, several of the factors identified and depicted in our conceptual model may not be specific to African Americans. Concepts like fear, susceptibility, cost, and provider knowledge of clinical guidelines appear to affect African Americans disproportionately in the literature, while factors like insurance and frequency of primary provider visits are also contributors in non-African Americans^{22, 40-42} Future research should address whether they are cumulative effects of the barriers to screening as we attempt to develop culturally-tailored interventions. Finally, given that multiple studies did not address all the domains investigated (patient, provider, and system factors), and that primary studies may not have reported outcomes that were facilitators to colonoscopy, the review may also be biased by selective reporting. However, for the purpose of this review, we aimed to focus on positive and negative associations that would inform future interventions.

In conclusion, our findings imply strategies for clinicians, researchers, and health systems. In this era of healthcare reform, it is now possible for physicians and patients to engage in an open dialogue about CRC screening without the shroud of financial impossibility that has previously stifled many patients' ability to receive appropriate care. The onus now falls upon patients and providers to utilize these services, and on researchers and healthcare organizations to determine how to translate our knowledge about barriers to screening into equitable delivery of universal CRC screening to all Americans.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Financial Support: None

Abbreviations

CRC	Colorectal cancer
IOM	Institute of Medicine
ACA	Affordable Care Act
PCP	Primary Care Physician
AA	African Americans
US	United States

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Study Highlights

- African Americans are at high risk of mortality from CRC but have low screening rates.
- Current literature does not contain a systematic review or conceptual framework synthesizing barriers to screening.
- Patient-level barriers include fear, lack of knowledge about CRC screening, and competing personal and medical issues.
- Provider-level factors include knowledge deficits of guidelines and barriers, and counseling practices.
- System-level factors include access to care, financial barriers, and infrequent primary care visits.

((colorectal cancer OR colorectal neoplasm OR colorectal tumor OR colorectal carcinoma OR CRC OR colorectal adenoma) OR Colorectal Neoplasms [MeSH] OR ((polyp OR polyps) AND (colon OR colonic)) OR Colonic Polyps [MeSH]) AND (colonoscop* OR Colonoscopy [MeSH] OR Colorectal Neoplasms/diagnosis [MeSH] OR Early Detection of Cancer [MeSH] OR screening OR prevention OR early detect* OR Diagnostic Tests, Routine [MeSH] OR Mass Screening [MeSH] OR Preventive Health Services [MeSH]) AND (African Americans [MeSH] OR ("African" AND American*) OR ("black" AND American*) OR minorit* OR Minority Groups [MeSH] OR Minority Health [MeSH]) AND (Patient Acceptance of Health Care [MeSH] OR (barrier* AND (screening OR testing)) OR Health Services Accessibility [MeSH] OR (disparity OR disparities) OR Health Education [MeSH] OR Healthcare Disparities [MeSH] OR health care seeking behavior OR attitude*) AND English [lang] AND ("1950/01/01"[PDAT] : "3000/12/31"[PDAT])

Figure 1.
Medline Search Terms

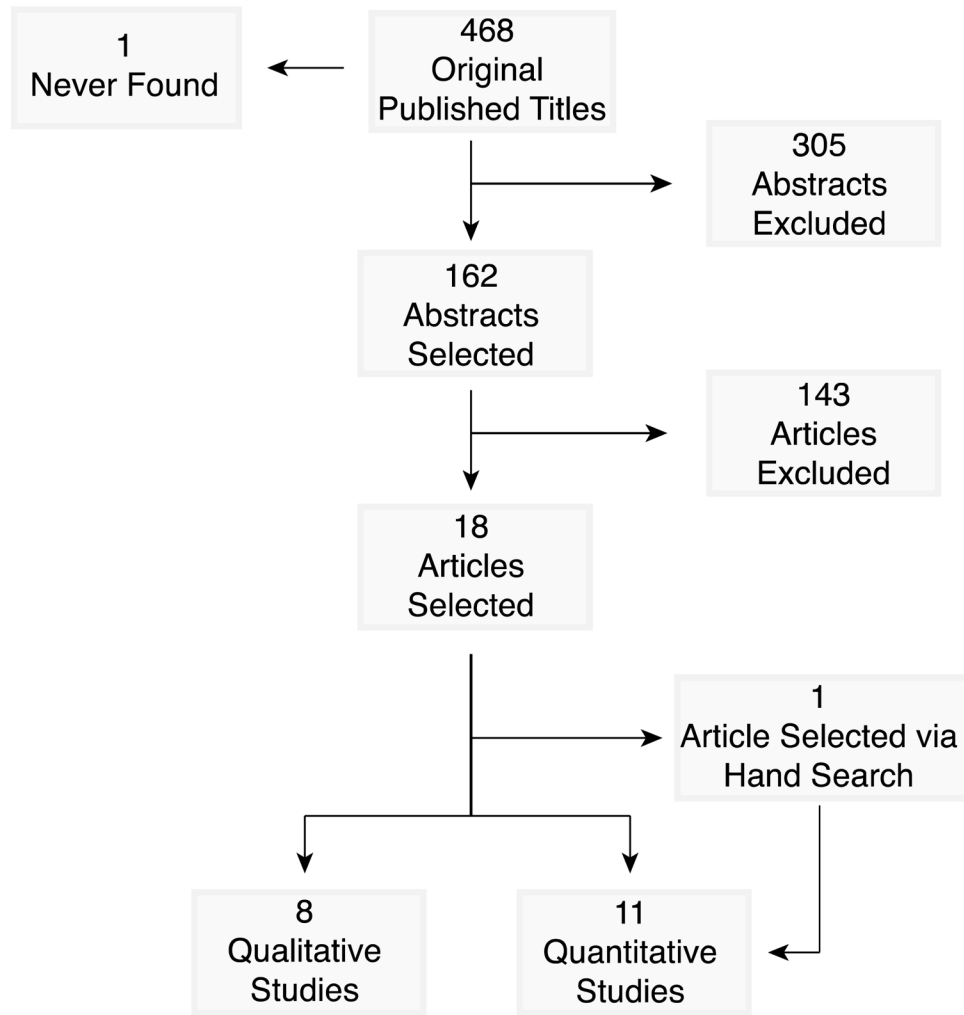


Figure 2.
Results of Literature Search

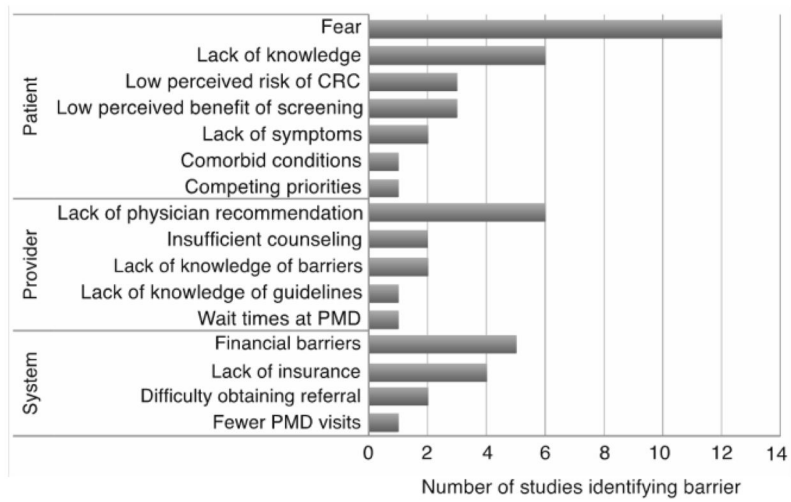


Figure 3. Number of studies identifying patient, provider, and system barriers to colonoscopic screening in African Americans.

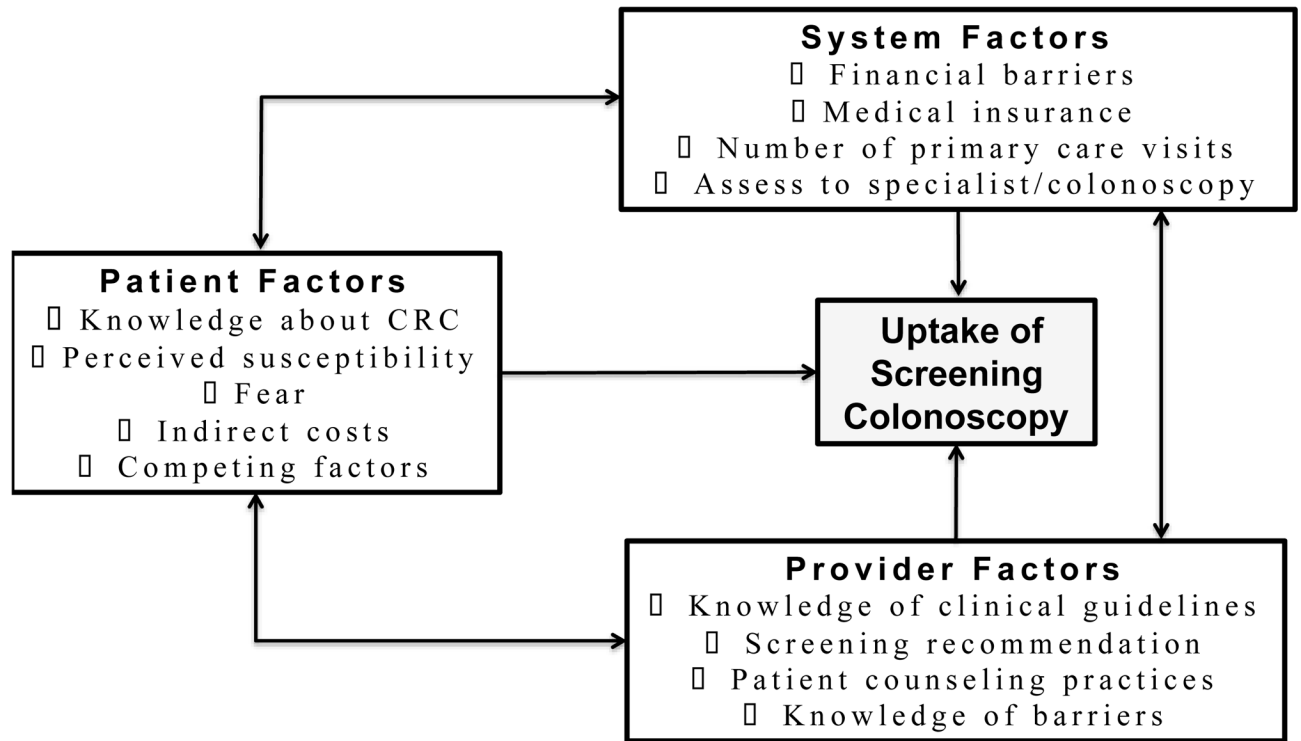


Figure 4.
Conceptual Model for barriers to uptake of colonoscopic CRC screening among African Americans

Table 1

Barriers to colonoscopic screening in African Americans: Qualitative studies

Study	Subject Population	% AA	Study Design	Patient Barriers	Provider Barriers	System Barriers	Study Quality Assessment
James <i>et al.</i> , 2011 ¹⁶	38 low-income adults at an urban community health center	100	Cross-sectional interviews and focus groups	Knowledge, fear (pain, invasion, cancer diagnosis and treatment), colonoscopy bowel preparation, cost, mistrust of provider and system.	Insufficient counseling and long wait times with primary care provider.		25 of 32 COREQ items
Palmer <i>et al.</i> , 2010 ¹⁷	60 adults with no history of colon cancer in an urban community health center in Washington DC	100	Cross-sectional interviews	Colonoscopy bowel preparation, perceived high risk and low benefit of colonoscopy, fear (invasion, sedation, and hospital/clinic setting).		Lack of insurance.	16 of 32 COREQ items
Winterich <i>et al.</i> *, 2011 ²¹	65 men with three levels of education from urban and rural settings in North Carolina	54	Cross-sectional interviews	Low education, fear of pain, and fear of invasion.			18 of 32 COREQ items
Bass <i>et al.</i> , 2011 ²⁵	23 low-income and insured adults from clinic at large urban hospital	100	Cross-sectional focus groups	Knowledge, fear (procedure, invasion, cancer diagnosis), and perceived lack of benefit of screening.	Insufficient counseling and lack of physician recommendation.		21 of 32 COREQ items
Holt <i>et al.</i> , 2009 ¹⁸	165 adults from rural and urban counties in Alabama with high projected rates of colon cancer	59	Cross sectional focus groups	Knowledge, low perceived risk of cancer, and fear (pain, cancer diagnosis, invasion embarrassment).	Lack of physician recommendation.		21 of 32 COREQ items
Winterich <i>et al.</i> *, 2009 ²⁴	64 men with three levels of education from urban and rural settings in North Carolina	55	Cross-sectional interviews	Fear of invasion.		Financial barriers, lack of insurance and lack of referral.	19 of 32 COREQ items
Palmer <i>et al.</i> , 2008 ²⁶	36 adults with no history of colon cancer from urban setting in Washington DC	100	Cross-sectional interviews	Knowledge, lack of understanding of procedure, low perceived risk of cancer, fear (pain, invasion, cancer diagnosis), mistrust of provider, competing priorities, and transportation.	Lack of physician recommendation.	Financial barriers, lack of insurance and of referral.	20 of 32 COREQ items
Beeker <i>et al.</i> , 2000 ¹⁵	Approximately 140 insured adults from urban and rural settings in several states	Not Stated	Cross-sectional focus groups	Fear and anxiety of invasion.			12 of 32 COREQ items

*** These two studies used the same study population in 2002 and in 2009

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Table 2

Barriers to colonoscopic screening in African Americans: Quantitative studies

Study	Subject Population	% AA	Study Design	Patient Barriers	Provider Barriers	System Barriers	Study Quality Assessment
Ruggieri et al, 2013 ²²	102 patients in an urban setting and 29 internal medicine residents	95	Cross-sectional survey	Fear (cancer, complications, pain), embarrassment, bothersome preparation, and cancer fatalism.	Physicians did not identify: 1) patient barriers (fear of pain, cancer diagnosis, embarrassment, and bowel preparation); 2) patient motivations (screening to avoid illness, removing precancerous growths, and; 3) patient facilitators (physician recommendation, accuracy of colonoscopy, and peace of mind).		17 of 22 STROBE items
Lukin et al, 2012 ³¹	157 unscreened patients in urban New York setting	100	Cross sectional interviews and chart review within randomized trial	Non-significant trend between comorbid conditions and unscreened status.		Higher proportion of colonoscopies in patients with more primary care visits (p-value not reported).	17 of 22 STROBE items
White et al, 2012 ³²	512 American Medical Association family practitioners, internists, and gastro-enterologists.	1.8	Cross-sectional web-based survey		28% correctly identified 45 as the age to screen African Americans. African American physicians were more likely than non-African Americans to identify this age (67% vs. 27.8%)		17 of 22 STROBE items
Wilkins et al, 2012 ¹⁹	635 rural Georgia residents	20	Cross-sectional interviews	Lack of understanding, fear (complication, bowel preparation, pain), lack of perceived benefit, lack of symptoms, and transportation problems were more likely to be reported by African Americans than by Whites.	Insufficient time with physician was more likely to be reported by African Americans than by Whites.	Financial barriers were more likely to be reported by African Americans than by Whites.	16 of 22 STROBE items
Benarroch-Gampel et al, 2012 ²⁰	974,879 Texas Medicare Beneficiaries	7.2	Retrospective review of Medicare claims	Low income negatively correlated with colonoscopy use.			21 of 22 STROBE items
Consedine et al, 2011 ²⁸	245 African Americans, Jamatcans, and	34	Cross-sectional survey	Fecal/rectal embarrassment and			16 of 22 STROBE items

Study	Subject Population	% AA	Study Design	Patient Barriers	Provider Barriers	System Barriers	Study Quality Assessment
Ward et al, 2010 ⁹	European-Americans in urban New York European-Americans in urban New York	13	Cross-sectional survey	physician-patient intimacy embarrassment were reported by African Americans and predicted screening. No difference across racial/ethnic groups.	Few residents perceived barriers including cost, access to care, need for referrals, and mistrust. Residents identified low patient knowledge, fear, logistics, bowel preparation, conflicting obligations, and comorbidities.		14 of 22 STROBE items
Tabbarah et al, 2005 ³⁰	375 low-income patients in urban Pennsylvania health centers	47	Cross-sectional telephone survey	Transportation problems were more likely to be reported by African Americans than by Whites.		Financial barriers more likely to be reported by African Americans than by Whites.	20 of 22 STROBE items
Janz et al, 2003 ²³	355 residents of urban Michigan	48	Cross-sectional telephone survey	Knowledge (African Americans were more likely than Whites to have never heard of colonoscopy).	Lack of physician recommendation for colonoscopy compared to FOBT or flex sig (p-value not reported). Recommendation associated with high colonoscopy completion (88-92%).		16 of 22 STROBE items
Taylor et al, 2003 ²⁹	74 patients in low-income, urban Seattle primary care center	100	Cross-sectional mail or telephone survey	16% believed African Americans more likely than Whites to get colon cancer. 53% believed colon cancer was preventable. Beliefs did not correlate with colonoscopy rates.	Ever having a physician recommendation was associated with having had a colonoscopy in the last 10 years.		17 of 22 STROBE items
James et al, 2002 ²⁷	397 participants in church-based health programs in urban North Carolina	98	Cross-sectional telephone survey	Lack of symptoms and lower age negatively correlated with colonoscopy within the prior 5 years. Fear reported but did not correlate colonoscopy rates.	Lack of physician recommendation negatively correlated with colonoscopy rates.	Financial barriers reported did not correlate with colonoscopy rates.	18 of 22 STROBE items

Unless noted in table, results reported are statistically significant.