



Research Article

# Are Contemporary Interventions Effectively Lowering Barriers to Colorectal Cancer Screening in African Americans?

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## Abstract

**Background:** African Americans (AAs) disproportionately experience higher prevalence and mortality rates of colorectal cancer (CRC) compared to other racial groups in the United States [1]. Despite advancements in screening methods, CRC screening rates in AA adults have remained marginally lower than projected quotas aimed at slowing prevalence and mortality rates [2]. Notably, AA populations face multi-causal barriers to CRC screening adherence. Barriers can be categorized into socioeconomic disparities, decreased proximity and access to healthcare providers, knowledge and self-efficacy disparity, and ongoing systemic and social bias [3-5]. Researchers, public health stakeholders, and healthcare professionals are currently exploring various interventions to curb demographic barriers and increase AA CRC screening rates. **Method:** This systematic review synthesized evidence from 20 recent studies on the interventions implemented to increase CRC screening rates in AA adults 45 years and older. Searching peer-reviewed, freely accessible articles written in English and published from 2019 to 2023 yielded over 400 citations with keywords below. These citations were narrowed down further to 163 by hand searching and eliminating studies that did not address colorectal cancer screenings. These studies were exported to a reference management application called RefWorks, which was used to eliminate any duplicate studies. After eliminating duplicate studies, the resulting 142 studies' abstracts were hand searched and separated into folders based on studies that discussed CRC screening rates in AA, CRC screening rates in the general population, and CRC screening interventions. These three folders of studies were then reviewed. Studies that were not experimental or quasi-experimental, not based in the United States, and did not include AA participants were all filtered out and excluded. This process left 40 articles for manual review based on inclusion and exclusion criteria, as seen in Figure 1. This review process yielded 20 final articles for analysis in the systematic review. **Results:** The literature review indicates that the most effective interventions that increase screening intent and completion in AA adults are multi-modal, patient-centered, and accessibility. Further, direct-to-patient delivered Fecal Immunochemical Test (FIT) kits showed a statistically significant increase in screening adherence compared to traditional endoscopic methods. This review illuminated the need for further research with larger sample sizes, better generalizability, multiregional AA populations, and increased AA male participants. **Conclusion & Implications:** This review has been instrumental in highlighting the importance of convenient, at-home, non-invasive, and low-cost testing options in filling this screening gap. One of the hypotheses of this review that may have otherwise been falsely accepted was proven wrong because a systematic review enabled the investigator to conduct a comprehensive, multifaceted exploration of the topic. This is precisely why systematic reviews are important, especially when attempting to understand complex health disparity issues that have multi-directional relationships to the social, political, and economic realities of society. It is important for healthcare professionals to seek solutions to healthcare disparities by performing a comprehensive and rigorous survey of research that can offer evidence-based understanding that transcends human ignorance and implicit bias.

**Keywords:** African Americans; CRC Screening Rates; Interventions; Fecal Immunochemical Test; Disparities; Barriers

## Background

Physiologically, everyone is at risk of developing cancer in the United States. Hence, one in three persons will have cancer at some point per certain variables [6]. Deaths from cancer are second only to those caused by cardiovascular disease in the United States [1]. In 2020, 602,350 Americans lost their lives to cancer, according to the CDC [1]. These figures are deeply concerning given the high mortality rates among particular groups. Among the significant racial and ethnic groupings in the U.S., African American (AA) males and females had the highest cancer death rate, at 167 per 100,000 [1]. Cancer has far-reaching effects on a person's life, including physical and mental well-being, economic standing, and social connections [7]. Cancer's monetary toll on people, their loved ones, and healthcare systems is alarming. "The total cost of cancer care in the United States in 2019 was projected to be more than \$21 billion," according to a study of the available data [5]. Patients' time and money are also factored into this total [5]. The disparities between different groups should be considered when estimating the total cost.

Particular cancers have associated prices which can be exorbitant when considering the low-income demographics most affected by these high-cost cancer types, as is the case with colorectal cancer in AA patients. According to a National Cancer Institute-sponsored analysis, in 2019, the colorectal cancer out-of-pocket cost ranked third highest at a national estimate of \$ 1.46 billion [5]. Statistically, "colorectal cancer incidence and mortality have been higher in African American individuals compared to their non-Hispanic White counterparts [2]." Of note, the average AA household income is about half the average White household income. Hence, the economic effects of colorectal cancer for the average AA patient can be disproportionate to the average White patient [8]. Pathologically, colorectal cancer does not discriminate, but social inequalities in access to care can lead to poorer results for certain people than others. Considering these challenges, efforts to reduce cancer rates across the board must prioritize protecting the most disadvantaged.

While no "typical" kind of cancer exists in the United States, minorities receive a disproportionate share of medical attention. Recent years have seen an uptick in the concentration of researchers and doctors on the issues of preventing, diagnosing, and treating Colorectal Cancer. Acquired or inherited DNA or genetic mutations are the most common causes of colorectal cancer [9]. As a result of these changes, abnormal cells may proliferate excessively and form tumors in the colon's or rectum's inner mucosa [9]. Most forms of CRC start with benign lesions or adenomas that turn cancerous due to the combined activation

of cancer genes and the inactivation of tumor suppressor genes [10]. Early screening can help identify such lesions to prevent progression and metastasis.

Most cases of colorectal cancer result from new, non-inherited mutations in the DNA, which can occur at any time during a person's life [9]. The incidence and severity of CRC have been linked to various factors, including but not limited to lifestyle habits, physical characteristics, food, gender, and ethnicity [9]. Inherited mutations cause colorectal cancer, and scientists are still trying to figure out how these risk factors work together. Professionals in the medical field are expected to be aware of and familiar with such associations to better counsel and care for patients who pose an exceptionally high risk within the larger community. CRC is not exclusive to any race or culture. However, it is more prevalent among African American adults [2]. In the African American community, colorectal cancer ranks third among the primary causes of cancer-related death [2]. African American males and females had the second highest incidence rate (46.8%) from 2014-2019, followed by Native Americans (49%). By the 1990s, the CRC incidence rates of African American men and women were lower than those of Non-Hispanic White men and women [2]. These disproportionately high rates of occurrence and mortality can be traced back to a combination of factors, including genetic predisposition, socioeconomic status, healthcare access disparities, rates of preventative screening, and the timing of treatment [2].

The American College of Gastroenterology recommends that people at average risk of developing CRC begin screening at 45 [10]. The best screening method, colonoscopy, is also the most intrusive and expensive. The fecal immunochemical test (FIT) is an at-home stool-blood test that is less expensive and invasive [4]. Guaiac-fecal occult blood test, flexible sigmoidoscopy, and cat-scan colonography are more diagnostic methods [10]. While the Healthy People 2030 (n.d.) target for people aged 50-75 for CRC screening is 74.4%, the current national rate is 62.5%. Comparatively, the estimated CRC screening rate among AA adults aged 50-70 in 2019 was 68.5%, higher than the national average but still not quite commendable [11].

"Research on CRC racial disparities and the development of adaptable therapeutics to reduce CRC incidence and mortality rates in AAs have progressed in recent years [3]". Increased CRC screening among AAs has been a focus in recent years. Studies suggest this population has poor colon cancer screening compliance due to cost, low health literacy, locality segregation, lack of healthcare access, mistrust of providers, and socio-structural barriers [4]. Contemporary efforts to address some of these barriers have focused on increasing knowledge and awareness among AAs through community outreach programs [4]. Other interventions

have focused on utilizing technology and educational materials to increase health literacy regarding CRC risks, prevention, and health implications [12]. Despite the well-intentioned initiative, the frequency of early CRC screening has yet to show the desired increase in African American participation [13]. Moreover, the most studied interventions do not address the gender-based screening disparities in African American communities.

The studies regarding communal outreach interventions mostly showed more positive outcomes for AA women than men [14]. The literature inquiry needed to yield more data on the interventions that increase CRC screening adherence in AA males. This paper's research and review aim to identify the barriers that interfere with early colorectal cancer screening and treatment in AAs through a literature review. Further, the efficacy of the efforts undertaken by healthcare professionals, healthcare organizations, and communities to modify barriers will be measured through careful analysis of the existing literature.

Current literature from 2019 through the present will be extracted and analyzed to answer three relevant questions in this paper. The first objective is identifying all statistically significant barriers to CRC screening in African Americans. Secondly, what interventions have produced measurable outcomes in increasing screening rates in the focus population? The third objective will be to identify gaps in the existing research on the topic and to recognize opportunities that further illuminate the barriers and associated interventions. The goal is not explicitly directed at African American adults, yet it still pertains to this special population. This study aims to determine whether there is evidence from the existing literature that modern interventions may overcome the barriers to screening to the extent necessary to achieve the goals of Healthy People 2030.

Because of the far-reaching consequences of cancer on individuals, communities, and society, a thorough study must be conducted to assess the status quo. Cancer is not just an individual's concern, as seen by the economic and human toll it takes. Researchers, doctors, hospitals, health networks, state and federal agencies, and international health coalitions have their hands complete with cancer. We can easily understand the healthcare system's shortcomings by looking at inequality. The fight against cancer has always received a disproportionate share of funding. However, certain groups of people have been left out of this effort. Cancer is a human problem, not a "White" or "Black" problem. This reality should inform both medical study and practice. Addressing healthcare injustice requires asking difficult

questions and searching for creative answers. The research and ideas that can better this continuing conversation can only drive the lives of future generations.

## **Design and Methodology**

### **Procedure**

The decision to utilize a systematic review design was made because it is hierarchically the highest form of research, evidenced by its rigor, level of evidence, and analysis. The topic of interest was selected due to the investigator's personal family experience with colorectal cancer. The study will be conducted to test three hypotheses: (H1) the major barriers to CRC screening in AAs are socioeconomic and systemic racism incorporating locational segregation, healthcare mistrust, and lack of access; (H2) community-based interventions are the most effective at increasing CRC screening rates in AAs, and (H3) the literature review will reveal the need for further research. The dependent variable is the CRC screening rate in AAs, and the independent variables are the interventions identified in the studies. With the topic selected, an initial search was done in the PROSPERO database of registered and published systematic reviews to eliminate duplicating similar studies on the topic. The investigation did not yield any studies that would result in duplication. The research was then broken down into steps of research and review of available literature on the topic, followed by systematic inclusion and exclusion of articles to undergo analysis. Using this information, the outline of the systematic review was broken down into the background, methodology and design, analysis and categorization, results, discussion, and conclusion.

### **Search Strategy**

A comprehensive search was conducted on the topic of interest, colorectal cancer screening in African Americans, through databases such as PubMed, CINAHL, PROSPERO, and Medline. The search method used a combination of key search terms "colorectal cancer screening", "CRC Screening AND African Americans," "CRC screening interventions AND African American," and "cancer screening interventions". The search strategy had inclusion filters for articles that were published from 2019 to 2023, in English, peer-reviewed, and open access or freely accessible online. The exclusion filters eliminated books, media, dissertations, newspaper articles, conference proceedings, and opinions. Further, selected articles' reference lists were manually searched for additional relevant sources. Please see Figure 1 for the detailed list of exclusion and inclusion criteria.

Inclusion Criteria	Exclusion Criteria
Studies that have AA Participants	Studies with no AA participants
Experimental or Quasi-experimental	Articles that do not address CRC at all
Males and Females	Studies located outside of the United States
Studies located in the United States	Participant populations younger than 45 years old
Articles in English	Studies published before 2019
Adults aged $\geq 45$ years old	Non-peer-reviewed articles
Addresses either cancer screening and, or colorectal cancer screening	Dissertations, Newspaper Articles, Conference Briefings, Media, Opinions
Studies from 2019 – Present day (2023)	
Peer-reviewed articles	

**Figure 1:** Inclusion and Exclusion Criteria.

### Study Selection

Searching peer-reviewed, English, freely accessible articles published from 2019 to 2023 yielded over 400 citations. These citations were narrowed down further to 163 by hand searching and eliminating studies that did not address colorectal cancer screenings. These studies were exported to a reference management application called RefWorks, which was used to eliminate any duplicate studies. After eliminating duplicate studies, the resulting 142 studies' abstracts were hand searched and separated into folders based on studies that discussed CRC screening rates in AA, CRC screening rates in the general population, and CRC screening interventions. These three folders of studies were then reviewed. Studies that were not experimental or quasi-experimental, not based in the United States, and did not include AA participants were all filtered out and excluded. This process left 40 articles for manual review based on inclusion and exclusion criteria, as seen in Figure 1. The review of the abstracts and full texts of these eligible articles was done and the final review process yielded 20 final articles for analysis in this study.

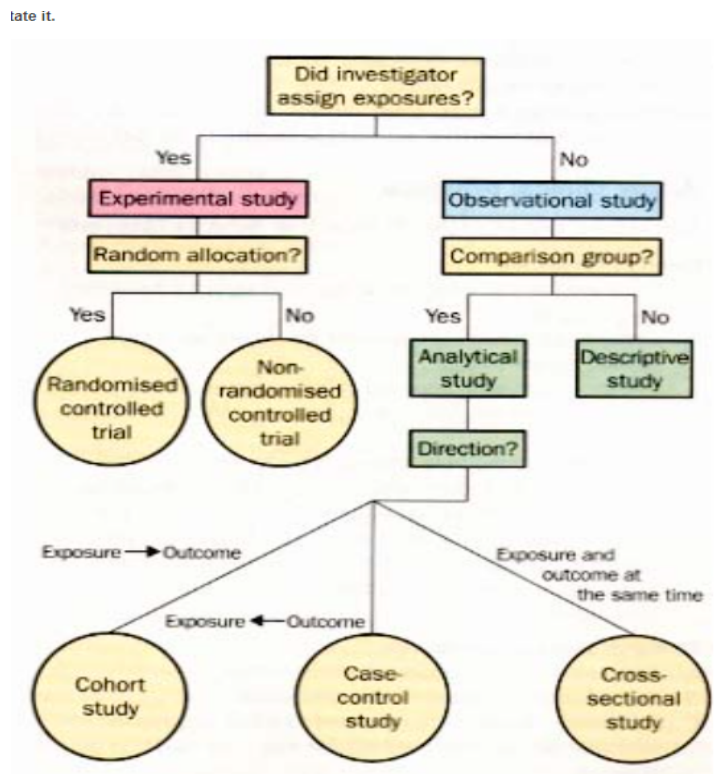
### Data Extraction

Analysis and review of the 20 included studies were conducted by hand search and extraction of the research type, background or conceptual framework, methodology, design, sampling, analyses, limitations, sample size, and the main findings of each study. To standardize the data, studies were then categorized based on the level of evidence, yielding the distribution into four different levels of evidence.

### Quality Assessment

Using extracted data, studies were assessed for quality following the hierarchy of evidence levels guideline [15-16];

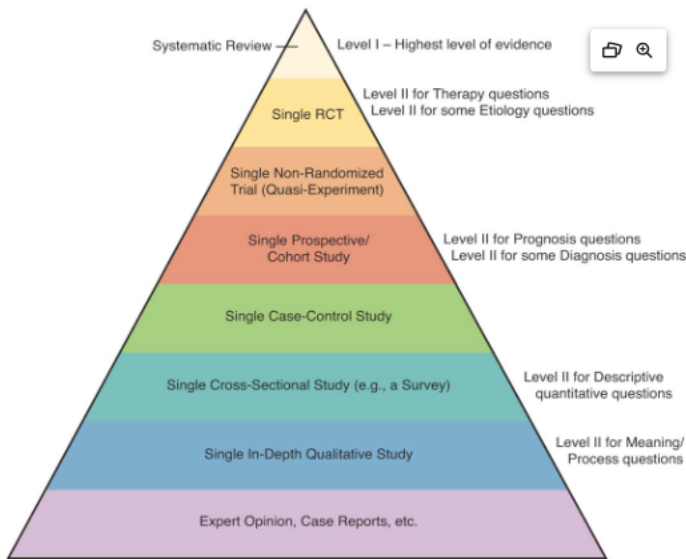
Evidence levels were assigned to studies based on the following features: research type, study design and methodology, analysis and results clarity, and study generalizability. Please see Figures 2 and 3 for the illustrations of the hierarchy guidelines adopted for quality assessment.



**Figure 2:** Illustrated guideline for study type categorization [16].



ter chapters.)



**Figure 3:** Level of Evidence Hierarchy Pyramid [15].

### Analysis and Synthesis

The analysis and synthesis of the data were based on the following process: if data results were consistent across all studies, then a statistical meta-analysis was conducted, but if there was evident heterogeneity, a textual narrative synthesis was conducted to summarize the review’s findings. The efficacy of interventions addressed in each study was analyzed through the critique of the sample size, length of intervention time, participant reports of perceived outcomes, and evidence of statistically significant outcomes in AAs 45 years and older. The results of this analysis was to answer the three initial objectives of this study: (1) to explore all the different statistically appropriate obstacles to CRC screening in AAs, (2) to identify the interventions that produced measurable outcomes in increasing screening rates in AA, and (3) to identify gaps and opportunities for future research to develop interventions for unmet barriers. Similarly, the analysis used to test three initial hypotheses as in: (H1) the major barriers to CRC screening in AA are socioeconomic and systemic racism incorporating geographical segregation, healthcare mistrust, and lack of access, (H2) community-based interventions are the most effective at increasing CRC screening rates in AA, and (H3) further research is needed to provide robustly evidenced literature.

### Results

An initial search in PubMed, CINAHL, and Medline datasets yielded over 400 results. Systematic exclusion of duplicate articles, articles outside of inclusion criteria, and hand-reviewed articles that did not meet eligibility narrowed the review

to 20 studies for analysis. Nineteen studies were quantitative, with one study using a mixed qualitative and quantitative method. Furthermore, ten studies were randomized controlled trials, two systematic reviews, two prospective cohort studies, one case-control survey, two descriptive studies, one cross-sectional survey, one cross-sectional pilot study, and one retrospective analysis. The study populations were 45 years and older and included AA participants in varying ratios of the total sample sizes. The sample size for this study (n), 43,555, was obtained by adding up every study’s AA sample size or the total number of AA participants 45 and older. All studies took place in the United States, with the majority in urban versus rural settings.

### Interventions and Barriers

Interventions explored in the studies can be categorized as tailored (to AAs), usual care or physician recommendations, patient navigation, mailed test kits, communication reminders such as text messages or automated calls, and community-based outreach. Barriers included in the studies were categorized as socioeconomic or lack of insurance, low self-efficacy, systemic racism or provider implicit bias, provider mistrust, geographical isolation or segregation, and lack of knowledge or risk. Tailored interventions were the most effective in increasing screening rates and knowledge, as seen in seven studies, followed by mailed test kits in four studies, one community-based study, one usual care study, one patient navigation, one communication study, and five inconclusive studies. The study with the most statistically significant increase in knowledge and screening completion was a study that explored the effects of multi-level interventions, including mailed test kits, reminder calls, physician recommendations, and patient navigation.

### Quality Assessment

Using guidelines, all 20 articles were categorized according to the level of evidence [15,16]. One study ranked at level I, eleven studies ranked at level II, followed by seven at level III, and one at level V. The most common limitation was decreased generalizability due to sampling homogeneity and insufficiency as found in 11 studies [4,14,17-25]. The other limitations were unaccounted confounders, overreporting, non-experimental designs, data heterogeneity, and high attrition rates respectively [4,24-28]. The strength in many of the studies was the randomization of participants as seen in the samples of ten studies. Most studies use regression analysis to illustrate clear relationships between outcomes and interventions. The studies also addressed their limitations and research gaps for future studies. Participant sampling was mostly limited to urban settings, thus resulting in sampling bias in many of the studies.

This limited the generalizability of many study findings, but the data still needed to be higher in validity and reliability, as evidenced by the rigorous analyses presented in the studies.

### **Narrative Synthesis**

Study findings did not prove H2 because community-based interventions alone did not show the highest efficacy for increasing CRC screenings. The interventions that were tailored to AAs and included mailed-out home FIT test kits showed consistently statistically significant increases in CRC screening rates, making them the most efficacious of the interventions. This was most likely due to the cultural competence of tailored messaging and education, the convenience of an at-home test kit, the perceived low invasiveness of at-home test kits, and the perceived low financial and time cost. Usual care or physician recommendations alone did not significantly improve screening rates because of mistrust of healthcare providers in AAs and lack of sufficient provider-patient shared decision-making. Although AA community outreach increased knowledge and intention to screen, it did not significantly increase screening completion. This finding was also true for non-tailored screening reminder automated calls and mailed letters or cards. Interestingly, interventions that did illustrate efficacy often had bigger impacts on AAs 50 years and older than AAs 45 to 50 years old, despite the recently increasing diagnoses of CRC in AAs 45 to 50 years old. Lastly, female AAs consistently had higher CRC screening rates than males, even when equally represented in the sample. The findings did support H1 because many of the studies included participant self-reports of barriers to screening as socioeconomics, provider mistrust, perceived systemic racism, and lack of access to clinics because of locational segregation.

### **Discussion**

This review has highlighted the importance of at-home screening access and convenience as a great indicator of screening completion in AAs. Mailing out at-home FIT test kits showed how significant convenience can increase screening completion. Further, this intervention also illustrates the importance of non-invasive options of testing to many AAs, especially males, as it does not challenge popular masculinity norms in the AA community. Another point of reflection is that FIT tests are lower in monetary cost but also lower in time cost when compared to traditional endoscopic tests such as a colonoscopy. This can be advantageous for many AAs who work full-time with little schedule and financial flexibility or do not have insurance. Public health initiatives should therefore focus more on providing affordable at-home screening options for AAs. Although community outreach helped increase a sense of knowledge and intention to undergo screening, it

showed little increase in screening completion [4]. These findings illustrate that knowledge is only sometimes the best indicator of action. Based on these findings, it can be deduced that for AAs, accessibility, convenience, and cost are strong barriers to CRC screening completion. This is important for healthcare providers, policymakers, and public health officials to understand so they can utilize resources to directly improve these barriers instead of wasting resources on education and awareness alone. It is also important for healthcare providers to understand the perception of invasive traditional CRC tests in the AA community, especially in males. It is important for providers to offer these individuals non-invasive testing options and improve the provider-patient shared decision-making process.

### **Limitations**

This review has several limitations. First, the topic of this review needs a robust survey of current high-quality research, and this made it difficult to find enough high-quality experimental studies. Second, this review has sampling bias due to the prevalence of the studies being conducted in urban, singular communities. This, in turn, also limited the generalizability of findings because rural or non-urban AAs were not equally represented in the sample. Future research should intentionally be conducted to include rural AA participants. Additionally, future research should also focus on the barriers AA males face that are different from AA females and what interventions are effective in improving screening rates in those individuals. Lastly, many of these studies took place within six months to a year and could not account for participants who completed screenings after a year of intervention provision. Future research should be conducted longer than the current one-year maximum following the administration of interventions.

### **Conclusion**

African Americans are at higher risk of CRC diagnosis and related mortality. The past literature has focused on increasing CRC awareness and knowledge in the AA community while missing opportunities to target other barriers. African Americans have historically faced significant healthcare disparities due to complex problems that can be traced to the systemic racism that is still pervasive in the United States. They are often omitted from meaningful medical research, but the recent focus on the alarming CRC rates in AAs has shed light on this problem. Scientists and healthcare professionals are starting to understand the need for more research that is not only inclusive of AAs but even focused on AAs. Colorectal cancer screenings in AAs are improving but are still not meeting the quota needed to lower the incidence and mortality rates in AAs. This review has been instrumental in highlighting the importance of convenient, at-home, non-invasive, and low-cost testing options in filling this screening gap. One of the hypotheses of this review that may have otherwise been

falsely accepted was proven wrong because a systematic review enabled the investigator to conduct a comprehensive, multifaceted exploration of the topic. This is precisely why systematic reviews are important, especially when attempting to understand complex health disparity issues that have multi-directional relationships to the social, political, and economic realities of society. It is important for healthcare professionals to seek solutions to healthcare disparities by conducting a comprehensive and rigorous survey of research that can offer evidence-based understanding that transcends human ignorance and implicit bias.

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