Health Disparities in Colorectal Cancer among African and Hispanic Americans in the United States

Abstract

In the United States, racial and ethnic minorities are more likely to die from colorectal cancer (CRC) than non-Hispanic whites (nHw). African-Americans (AA) and Hispanic Americans (HA) are the two largest minority populations in the United States. Despite increased efforts to increase CRC screening, AA and certain segments of the HA population continue to experience increased incidence and mortality when compared to nHw. Even with the implementation of the Patient Protection and Affordable Care Act (PPACA), disparities in CRC screening will continue to exist until specific interventions are implemented in the context of AA and HA, since both populations are not monolithic rather, heterogeneous in nature. The purpose of this review is to highlight the differences in incidence and mortality as well as the interventions that have been performed to close the incidence and mortality gap between AA and HA when compared to nHw.

Keywords: Neoplasia; Polyps; Race; Ethnicity; Colonoscopy; Location

Introduction

In the 2010 Census, just over one-third of the U.S. population identified themselves as being something other than being non-Hispanic white (nHw) alone. This group has increased in size from 86.9 million in 2000 to 111.9 million in 2010, representing an increase of 29 percent over the ten year period. Per the American Cancer Society, racial and ethnic minorities are more likely to develop cancer and die from it when compared to the general population of the United States. This is particularly true for colorectal cancer (CRC). The primary aim of this review is to highlight existing disparities in CRC among the 2 largest racial and ethnic minority groups (Hispanic and African Americans) in the United States. The secondary aims of the review are to provide a greater understanding on why these disparities persist as well as determine means to close the incidence and/or mortality gap in CRC between nHw and these 2 racial/ethnic minority groups.

CRC among African-Americans

Incidence and mortality

Disparities in incidence and mortality in colorectal cancer (CRC) continue to persist between African-Americans (AA) and nHw, despite the provision of widespread screening and improved treatments for CRC. The reduction in CRC mortality has been more significant for both nHw males and females when compared to all other racial groups in the United States [1-6]. Even with the reported declines in incidence and mortality among AA, incidence and mortality from CRC is higher among AA when compared with other racial and ethnic groups [7]. The disparity in CRC mortality between AA and nHw is particularly evident in distant stage CRC. Robbins et al. observed a 28% difference in incidence in the diagnosis of distant stage CRC between AA and nHw. In the same study, it was observed that this difference accounted for more than 60% of the total mortality disparity from CRC [6]. In addition, AA has an earlier median age at CRC diagnosis when compared to nHw [8].

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The cause for the disparity in incidence and mortality is multifactorial. Inequalities in screening and the understanding of family history have been implicated and will be discussed later in the article. Epidemiological studies have identified disparities in protective factors and risk factors for CRC. It is thought that environmental risk factors account for the majority of CRC risk which is understood to be approximately 65% [9]. Risk factors for CRC include but are not restricted to smoking, obesity, consumption of a either a high fat/calorie/ red meat diet, alcohol use, low consumption of calcium or fish oils, decreased exposure to vitamin D, and low selenium [10-13]. The micro biome and its products have been implicated in contributing to the risk of CRC development [14]. When data prior to the use of widespread screening CRC is evaluated, an imbalance between protective factors and risk factors were noted among AA which led to increased mortality from CRC compared to nHw. [2]. It is unclear what the imbalance between protective and increased risk factors currently plays in the observed CRC disparity among AA versus nHw.

Disparities in CRC treatment

Even though the efficacy of treatment for CRC appears to be similar between AA and nHw among equal access systems and participants in adjuvant chemotherapy trials [15,16] there continues to be differences in care after the diagnosis and treatment of CRC [17-19]. Multiple investigators have shown that independent of CRC resection and post operative adjuvant chemotherapy, physical activity and diet play significant roles in affecting mortality [20-22]. Tehranifar et al. also reported that cancer survival disparities between AA and nHw has widened as cancers become more amenable to medical interventions [23]. AA may be less likely to receive newer agents for chemotherapeutic agents and are less likely to be treated in high quality or high volume facilities, which are known to have better outcomes [24,25]. AA has an identified mistrust of medical research and researchers as their primary resistance to participation in medical research resulting in decreased participation in clinical trials [26]. Further study needs to be dedicated to understanding why AA are not receiving or do not have access to similar medical and pharmaceutical technologies as nHw which can improve mortality outcomes.

Disparities in understanding family history of CRC

Family members of CRC patients have been identified as a risk group requiring increased focus on the correct timing of CRC screening vs. surveillance and more intensive surveillance when compared to those without a family history of CRC. Approximately 25 percent of patients with CRC have a family history in one or more family members [27]. For example, having one or two first degree relatives with CRC is associated 1.72 and 2.75 fold increased risk for the development of CRC [28]. Patients with a significant family history of CRC are screened at an earlier age and placed under more frequent surveillance intervals to determine the presence of potential adenomas and/or cancers [29]. Overall, patients with a family history of CRC are more likely than those without to undergo CRC screening, but this trend has not been uniform among all races and ethnicities. AA and Hispanics with a family history of CRC have the lowest likelihood of participation in screening [30]. In addition, AA is less likely than nHw to know their paternal history of cancer or have inaccuracies in knowledge of their family history of cancer [31,32]. Screened AA family members are less likely to tell their relatives about the finding of colon polyps [33]. Thus, lack of information, knowledge, or transmittal of medical information as well as understanding of factual information from the patient, has the potential to incorrectly place a patient in the sporadic CRC screening category instead of the family history category, affecting correct timing of screening and potentially placing the patient at increased risk for the development of CRC.

Disparities in screening

Screening for colorectal cancer (CRC) is a cost-effective strategy to reduce the CRC prevalence in the general population and can reduce the morbidity and mortality of CRC [7,34]. Lack of CRC screening has also been shown to delay the diagnosis in CRC among AA [35,36]. National Health Interview Survey results from 1987-2008 showed screening among adults older than 50 years of age increased significantly for both AA and nHw [37-40]. Nevertheless, screening for CRC in AA continues to lag behind nHw irrespective of whether endoscopy or fecal occult blood testing was the screening approach used [41].

Studies have suggested that when compared to nHw, AA are more likely to be diagnosed with CRC at younger ages, present with proximal tumors and be diagnosed with advanced neoplasia [16-19,42-45]. A significant number of CRC are diagnosed before the recommended screening age of 50. For example, approximately 5.5% of all CRCs occur prior to the age of 50 years in nHw, whereas for AA, approximately 10.6% of CRCs occur prior to age 50 [46].

Based on the aforementioned percentages, if screening started at age 45 years for AA, it has been postulated that approximately 95% of CRCs would occur after that screening age which would equivalent to screening nHw at age 50 [47]. Even though the widely adopted recommendation is to begin CRC screening from 50 years of age for average risk individuals in the United States, there are multiple societies stating AA should undergo CRC screening before the age of 50 [31,48]. Evidence points to reasons for decreased screening between AA and nHw even in equal access settings. Initial work within an equal access system indicated no difference between AA and nHw in CRC screening program participation, however in a recent study by May et al. found different results. AA was less likely to undergo CRC screening by any method and colonoscopy use for CRC screening was significantly lower when compared to nHw [49,50]. As stated earlier, previous studies reported AA have decreased trust in healthcare professionals when compared to nHw [51]. Decreased levels of trust in the healthcare system has resulted in AA having less healthcare encounters than nHw and a reduced opportunity to engage in effective physician-patient communication [52-54]. AA is also less likely to experience continuity of care and is more likely to be uninsured [55]. AA is more likely to be of lower socioeconomic status than nHw. Lower socioeconomic status is associated with a reduced screening rate and individuals who live in lower socioeconomic neighborhoods are less likely to undergo screening.
a colonoscopy, even among insured subjects receiving care in integrated healthcare system [56,57].

**Means to improve CRC screening rates**

Real and perceived barriers have been identified as reasons for AA not undergoing CRC screening at the same rate as nHw. Hispanic Americans (HA) are known to have similar socioeconomic, environmental backgrounds and behavioral tendencies as AA but are noted to have lower CRC incidence and mortality rates when compared to AA. This may be suggestive of differences in healthcare care utilization, biology of CRC between the two groups or other risk factors [58]. A number of methods have been studied to improve screening rates among AA. The interventions include but are not limited to, emphasis on physician recommendation, improved health care coverage and patient navigators. These have met with varied success. Physician recommendation has been determined to be an important factor for completion of CRC screening [59,60]. However, increasing availability of primary care physicians and colonoscopy providers has not closed the disparity in CRC screening between AA and nHw. Instead, the opposite has occurred, colonoscopy rates increased among nHw and decreased among minorities [61,62]. Therefore, it has been suggested that an urgent unmet need exists to increase participation of minorities as care providers in biomedical fields and to improve cultural competencies of all care providers [62,63]. Studies have suggested a higher completion rate of CRC screening when the underserved are offered fecal occult blood tests [64,65]. It appears that there are wide geographic variations in availability of colonoscopy to the population and the acceptability of fecal based tests to the underserved. Further studies will be required to determine if AA would be more receptive to fecal occult testing and if this affects CRC screening rates when compared to colonoscopy as well as improves CRC mortality compared to nHw.

AA is less likely to have healthcare insurance when compared to nHw [55]. Even though this gap may close under the Patient Protected Affordable Care Act (PPACA), White et al. observed that despite expansion of Medicare coverage for CRC screening tests, racial and ethnic differences in CRC screening persisted over time among this insured population [66,67]. Improved health care access by expansion of insurance is important to increase preventative care utilization, but cannot be the sole means to reduce the racial disparity observed in CRC screening. A meta-analysis performed by Naylor et al. provider-directed multi-modal interventions which comprised of education sessions, reminders and pure educational interventions were found to be effective in raising CRC screening rates in minorities by 10%-15% [68]. Tailored patient education combined with patient navigation services, and physician training in communicating with patients of low health literacy, can modestly improve adherence to CRC screening. It is unknown if the use of a patient navigator affects CRC mortality. Nevertheless, these interventions will not capture all patients who are in need of CRC screening or who are non-adherent to patient navigator programs. Sly et al. found that the there are certain intrapersonal and interpersonal characteristics of non-adherent navigated AA patients. Intrapersonal characteristics such as fear/anxiety about colonoscopy, lack of knowledge of CRC, believing the CRC results in death played a role in non-adherence in receipt of colonoscopy. In addition, inadequate explanation of colonoscopy, social burden and life circumstances were found be reasons for non-adherence [69]. Further studies will be needed to determine if addressing such issues will result in improved CRC screening rates and help reduce CRC mortality gap between AA and nHw.

**CRC in Hispanics**

**Background:** The term Hispanic refers to individuals of Mexican, Puerto Rican, Cuban, Dominican and additional Central/ South American as well as other Spanish ancestry based on self-identification on the 2010 United States Census [70]. In 2013, the American Community Survey estimated the national Hispanic population at 55 million or 17.1% of the US total [71]. The majority of HA identify themselves of Mexican (64.0%), Puerto Rican (9.5%) or Cuban (3.7%) descent [71]. Additionally, the Hispanic population is unique relative to the remainder of the nation with regard to socioeconomic status and immigration history. For 2013, 24.3% of Hispanics were uninsured and 34% foreign-born compared to 12.7% and 10% of nHw and 15.7% and 10.9% of AA respectively [72]. Furthermore, Hispanics are an admixture of Amerindian, African and European individuals, the contribution of each racial genotype may vary among subgroups potentially impacting CRC. The goal of this segment of the review is to illustrate what is known about the epidemiology, screening, endoscopic findings at colonoscopy, and outcome of CRC in the Hispanic population of the United States.

**Incidence of CRC**

In both Hispanic males and females, CRC is the second most common cancer identified [73]. Nationally, incidence rates in Hispanics are less than those observed in both nHw and AA [73-77]. In spite of decreasing overall incidence, rates appear to be increasing in younger individuals (<50 years old) of all racial and ethnic groups [78,79]. Interestingly, the greatest increase in incidence rates from 1993-2007 occurred among young Hispanics (45%) compared to nHw (27%) and AA (15%), [80]. In addition, incidence rates vary based on Hispanic subgroup as well as migrant status to the continental 48 states [80-88]. Initial studies on incidence were based on older data (1958-1990) and only evaluated Puerto Ricans (PR) and Mexican Americans (MA), [80-86]. The primary findings of this initial work indicated that cancer risk varied dependent on location for PRs and migrant status for MAs. Residents of Puerto Rico had the lowest incidence of CRC in the continental 48 states PR intermediate and nHw the highest rate [80,85-86]. A similar pattern was observed between immigrant MAs, US born MA and nHw [81,82]. Recent data indicates this circumstance has continued in both PR and MA Hispanic subpopulations with some notable variation [87-89]. Monroe and associates reported among MA, residing in Los Angeles CA and participants of the prospective Multiethnic Cohort Study, striking variation in CRC incidence rates [87]. Immigrant MA continued to have a lower incidence rate of CRC compared to nHw. However, following generations had higher incidence rates than nHw with the greatest comparative increase (86% for MA males and 61% for MA females) in the generation
following migration to the United States [89]. Ho and colleagues evaluated CRC incidence rates in island PR, mainland PR and US nHw from 1998-2002 [88]. As noted in previous literature, lowest CRC incidence rates were seen among island PR and highest in nHw. The incidence rates for mainland PR males and females were between the groups listed above [90]. Interestingly, the mainland PR male and female rate approached the nHw rate rather than the island PR rate. This trend may suggest greater acculturation of the mainland PR group (residents of New York, New Jersey and Connecticut) adopting the lifestyle and chronic disease patterns of their new location in comparison to island PR [89-91].

In a unique evaluation of cancer in Florida residents, Pinheiro et al. assessed cancer incidence rates, including CRC, among Hispanic, nHw and AA from 1999-2001 [92]. Also determined were incidence rates, including CRC, in the states HA subgroups: Cuban Americans (Cub), PR, MA and a 4th category of new Latinos (consisting of individuals from the Dominican Republic, Spain, as well as other Central and South American Spanish speaking nations). Of note, CRC incidence of the composite Hispanic group (male 67.8/100,000, female 52.9/100,000) was either equivalent or greater than to that seen in nHw (male 68/100,000, female 48.9/100,000) and less than what was observed in AA. However, when examining Hispanic subpopulations, Florida Cub (44.2/100,000) and PR (46.9/100,000) had higher CRC incidence compared to Florida nHw (42.5/100,000) and place or origin (Cub 13.4/100,000; PR 26.6/100,000). MA CRC incidence (21.8/100,000) was lower than FL PR, Cub and nHw but higher than observed in Mexico (7.9/100,000). These findings also suggest an acculturation effect for PR and Cub in Florida that has not occurred for MA or new Latinos.

**CRC among Hispanics**

Multiple studies indicate that CRC screening decreases incidence, improves survival and mortality [43,53,93-96]. In 2010, CRC screening among adults >50 years old varied by ethnicity, with the lowest rate occurring in Hispanics (47%) when compared to nHw (62%) and AA (56%; [73,97]. Regarding use of lower endoscopy for CRC screening, again Hispanics (45.3%) lagged behind both AA (53%) and nHw (58.5%, [79]) In addition, screening rates appear to vary according to location of origin with PR having higher rates of screening compared to MA, Cub, Dominican or Central/ South American Hispanics [73]. Finally, screening rates for the uninsured are less for Hispanics and nHw compared to insured of both groups; screening is less frequency in uninsured Hispanics (19.5%) compared to nHw (21.6%, [73]).

Interventions to improve screening rates include direct access endoscopy, patient navigation as well as physician/patient counseling and education. Direct access endoscopy allows for primary care physicians to refer patients meeting specific criteria to colonoscopy without a pre-procedure visit [98]. Patient navigators are individuals trained to guide patients through the process of obtaining colonoscopy post physician referral [99]. This includes scheduling, transportation, procedure date reminders as well as answer questions that may arise. Physician counseling or education of patients with low health literacy has also been shown to increase CRC screening rates [100]. The combination of direct access endoscopy, physician/patient education and patient navigation in New York City led to elimination of disparities in timely colonoscopy between insured, nHw, AA and Hispanics [101]. Also, use of similar combined efforts in the uninsured and underinsured can be successful in obtaining screening colonoscopy as well [102].

**Findings at CRC screening**

Multiple studies have evaluated either screening flexible sigmoidoscopy or colonoscopy in Hispanic individuals with variable outcomes indicating Hispanics have either lower, equivalent or higher risk compared to nHw [103-109]. Higher prevalence of adenomas among Hispanics compared to nHw has been reported by 2 groups [103,104]. This occurred in the distal and proximal colon as well as for polyps with any advanced feature (>10 mm in size, or exhibiting advanced histologic features such as either villous or tubulovillous characteristics as well as high grade dysplasia). Equivalent prevalence was seen in 3 studies between Hispanic and nHw patients with regard to prevalence of adenomas overall, proximal adenomas, polyps ≥ 10 mm, proximal polyps ≥ 10 mm, or advanced features although 1 study had limited power due to small sample size [102,105,106]. Lower prevalence was observed from a national endoscopic database as well as a university medical center from the Northeast United States [107,108]. Finally, comparisons between Hispanics and AA have also occurred with either equivalent findings between the 2 groups or AA having an increased prevalence [109,110]. Interestingly, all of these studies did not evaluate by Hispanic subgroup or migration status, limiting applicability to the entire population.

**Care after CRC screening**

Hispanics are less likely to be diagnosed with early stage CRC compared to nHw [79,110,111]. This is most likely due to reduced screening rates and access to care as stated above [73,97]. Of note, overall five-year CRC survival rates are equivalent between Hispanics and non-Hispanic whites [73,77]. However, Hispanics have not seen increases in survival when compared to nHw for metastatic CRC [111]. In addition, migrant or subgroup analysis of the Hispanic population with regard to staging or survival has not occurred to date.

**Conclusions**

Despite overall rates of CRC decreasing nationally, disparities continue to be noted in incidence and mortality of AA and HA when compared to nHw. These disparities in incidence and mortality are related to socioeconomic and areas of deficiency. The areas of deficiency include, but are not limited to knowledge of family history, access to care, understanding migration and acculturation patterns, as well as a paucity of clinical data, especially among HA. These deficiencies currently limit true understanding of the disease and hinder intervention development to close the disparity gap. Even with implementation of the PPACA, disparities in CRC screening will continue to exist until specific interventions are implemented in the context of
AA and HA, especially considering migration patterns of Hispanic sub segments (Caribbean, Mexican, Central as well as South American) and African immigration. Both groups cannot each be viewed as one monolithic group, but instead as multiple distinct populations since there are differences in incidence and mortality based on the natural history of CRC impacted by gender, ethnicity, and nationality, access to care as well as migration and socioeconomic status. Progress has been made to date but much remains to be done.
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