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Is obesity associated with colorectal cancer screening for African American and Latino individuals in the context of patient navigation?

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Abstract

Purpose—The association between excess body weight and colorectal cancer screening is not well established. The purpose of this analysis was to explore, in the context of patients receiving navigation, whether obesity influences receipt of screening colonoscopy among lower-income Latinos and African Americans.

Methods—This sub-analysis was conducted among Latinos and African American participants who received patient navigation and had complete BMI data (N=520). Cross-sectional survey data was collected at baseline among individuals 50 years and older who were referred by their primary care providers for a colonoscopy at Mount Sinai's Primary Care Clinic. BMI was based on height and weight data from chart review at baseline and colonoscopy completion status was collected at 1 year post-baseline.

Results—The mean BMI of the sample was 31.17 kg/m², with over half (53%) of the sample categorized as obese. Rates of colonoscopy screening were high (~80%), regardless of weight status. Adjusting for age, gender, race/ethnicity, family history of colorectal cancer, smoking status, comorbid conditions, income, marital status, insurance and education, obesity status was not significantly associated with screening behavior among the entire sample (adjusted OR = 0.81, CI: 0.49-1.32, *p*=0.39) or among stratified race/ethnicity and gender groups.

Conclusions—These findings suggest that obesity may not negatively influence receipt of colonoscopy screening in the context of patient navigation among minority participants. Further

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studies are needed to determine whether this finding will be observed in other populations, with and without the assistance of a patient navigator.

Keywords

Obesity; Colorectal Cancer Screening; Patient Navigation

Introduction

Colorectal cancer (CRC) is the third most frequent cancer diagnosis, and the second most frequent cause of cancer-related mortality, for both men and women in the United States [1]. Early detection of pre-cancerous and cancerous lesions by screening can significantly improve the five-year survival prognosis to in excess of 90% [2]. Despite this, screening rates remain less than optimal, particularly among racial and ethnic minority groups [3, 4]. The American College of Gastroenterology (ACG) has promoted colonoscopy as the preferred screening test and recommends that individuals undergo colonoscopy every ten years starting at age 50 [5].

While uptake of screening colonoscopy has been increasing in recent years at the national level, a number of individual, provider, and structural barriers to CRC screening have been identified for individuals of diverse ethnic and racial backgrounds. These barriers have included, amongst others, limited knowledge, lack of provider recommendation, fear, cost of screening and embarrassment [e.g. 6]. Excess weight and obesity have also been identified as potential impediments to adhering to preventative health guidelines [7], perhaps related to embarrassment, competing health issues, provider bias, or perceived discrimination [8]. Recent reports estimate that over 35% of U.S. adults are obese (Body Mass Index (BMI) 30), with African American and Latino groups at increased risk of being obese [9]. Obesity has also been noted as a risk factor for the development of CRC, and is associated with worse disease outcomes once diagnosed [10].

Excess body weight has been most consistently associated with lower rates of cervical and breast cancer screening, particularly among white women [11]. The relationship between excess body weight and CRC screening behavior however, remains to be firmly established [12]. A number of large [13] and small cohort studies [14] have reported significant associations between obesity and reduced rates of CRC screening, including amongst an uninsured ethnically diverse cohort [15]. Leone and colleagues emphasized the importance of examining this relationship in the context of race, reporting that obese white women were less likely to be adherent to CRC screening guidelines, whereas obese African American women were more likely to be adherent than referent groups [16]. By contrast, Cohen and colleagues [17] reported no association between excess body weight and CRC screening, except in a subgroup of white women with BMI's in excess of 40 and reporting health insurance coverage or income greater than \$25,000 annually. Further null findings have been reported in analysis of data from the 2000 National Health Interview Survey [18], while Kendall reported obese status to be associated with higher odds of screening in Medicare beneficiaries [19]. These conflicting findings could relate to differences in samples, recruitment strategies, or type of screening modality examined. This suggests that

race/ethnicity, gender, and possibly socio-economic status, may play important roles in understanding or modifying the relationship between excess body weight and CRC screening behavior.

A number of interventions have sought to address barriers and promote adherence to CRC screening guidelines, including patient navigation that provides guidance in negotiating the complex healthcare and medical system [20]. One question that has not been explored to date is whether the potential association between excess weight and CRC screening engagement might be attenuated by a patient navigator care model? We recently reported that patient navigation increases the completion rate of screening colonoscopy among low-income urban minority men and women [21, 22]. In the current study we examined whether obesity was associated with colonoscopy screening for African American and Latino individuals within the context of patient navigation. In recognition of the limited and inconsistent research pertaining to obesity and CRC screening, especially in the context of patient navigation, this secondary analysis is considered exploratory in nature.

Materials and Methods

Study Setting and Recruitment

Individuals who were referred by their primary care providers (PCPs) for a screening colonoscopy were recruited during a routine scheduled (non-acute) visit to Mount Sinai's Primary Care Clinic between May 2008 and December 2011. Recruitment was part of two larger studies investigating different forms of patient navigation (e.g. professional v. peer navigators) to increase adherence to CRC screening via colonoscopy among African American and Latino participants [21, 22]. To be eligible, participants had to: 1) be over 50 years old; 2) have no active gastrointestinal symptoms, serious comorbidities (e.g. severe heart disease), or a history of inflammatory bowel disease or CRC; and 3) not have undergone a recent colonoscopy (in the past five years based on institutional policy) or be up to date with other recommended forms of CRC screening (e.g. FOBT, flexible sigmoidoscopy).

PCPs and medical assistants were told about the study and eligibility criteria, referred eligible patients to the study, and ordered the screening colonoscopy using an electronic medical record. Detailed enrolment information has been published previously [22]. Both parent studies were approved by the Institutional Review Board of the Mount Sinai School of Medicine.

Study Sample

A total of 1329 individuals were referred for screening colonoscopy and to the study. Of those, 120 refused (9%), leaving a sample of 1209 patients enrolled. Twenty-seven of these patients should not have been consented to the study (e.g. did not have working phone), resulting in a sample of 1182 participants. Due to medical or substance use reasons, patient withdrawal or death, an additional 228 were deemed to be ineligible for the study, leaving a total of 954 participants. The sub-sample for these analyses are the 520 participants who were randomized to receive patient navigation whereby patients were contacted by

telephone to facilitate completion of their screening colonoscopy (N=809)[21, 22], identified as being African American or Latino (N=717) and had complete BMI data (BMI 18.5, N=520). All participants received a scheduling call as well as two follow-up/reminder calls leading up to the procedure where needs were assessed and information and support were provided.

Measures

Demographic and Medical Characteristics—At the beginning of the study, participants completed a socio-demographic questionnaire which included age, race/ethnicity, employment status, income, marital status, education, country of origin and family history of colorectal cancer. Additional details regarding insurance type, BMI, comorbid conditions and smoking status were extracted from medical charts. A 1-year post-baseline review of medical charts was undertaken to determine whether each participant had completed their colonoscopy screening, and to collect the aforementioned variables from the baseline visit documentation.

Analysis

Descriptive statistics were employed to check for non-random patterns of missing data and to describe the study sample. Variables were dichotomized based on sample distribution and clinical relevance. In line with previous research, obese status was dichotomized as obese (BMI ≥ 30) or non-obese (BMI 18.5-29.9). There were no differences based on BMI (valid vs. missing) with the exception of insurance status (those with valid BMI were more likely to be private/self-pay). For multivariate analyses of the entire sample we adjusted for age, education (less than HS education vs. HS graduate or greater), marital status (married/partnered vs. single/without partner), income (less than \$10,000 vs. \$10,000 or more), insurance status (Medicare/Medicaid vs. private/self-pay), family history of colorectal cancer (yes vs. no), number of comorbid conditions and current smoking status (yes vs. no). Guided by the exploratory nature of the current study and previous research findings [16, 17], stratified multivariate logistic regression models were conducted to examine the association between obesity status and CRC screening behavior across gender and racial/ethnic groups. For the exploratory stratified analyses we adjusted for income, as this was the only factor associated with the outcome variable.

Results

The study sample consisted of 520 participants of whom most were female (70%), with a mean age of 58.9 years. The sample was evenly split, with 52% of Latino origin and 48% African American, and the majority (80%) were covered by Medicare or Medicaid. Nearly half (42%) reported an annual income below \$10,000. The mean BMI was 31.9 kg/m², with 53.5% of the sample in the obese range (BMI ≥ 30). Colonoscopy completion rates did not differ significantly amongst those of normal weight, and those who were overweight, obese (class I) or obese (class II), with completion rates of approximately 80% across all four groups. Missing BMI data was random and constituted roughly 4% of data across relevant demographic variables. Full demographic details are displayed in Table 1.

Binary logistic regression analyses were conducted to examine whether obese status was a significant predictor of screening behavior (colonoscopy adherence) in the context of patient navigation. Unadjusted and adjusted analyses (controlling for age, gender, marital status, race/ethnicity, family history of CRC, smoking status, insurance, income, comorbid conditions, education status) revealed obese status (BMI ≥ 30) was not a significant predictor of screening behavior across the entire sample (unadjusted: OR = 1.01, CI: 0.66-1.55, $p=0.95$), adjusted: OR = 0.81, CI: 0.49-1.32, $p=0.39$) or for each of the four stratified race/ethnicity and gender groups (controlling for income). Group-based adjusted analyses are shown in Table 2.

Discussion

Excess weight may represent a barrier to adherence to CRC screening; however the relationship between obesity and screening is complex, findings inconsistent, and debate continues as to whether obese individuals should receive targeted screening promotion [23]. This study sought to provide novel insight into the relationship between weight status and colonoscopy screening in a large sample of minority individuals of predominantly low socioeconomic status and in the context of patient navigation targeting.

Colonoscopy screening rates were approximately 80% across race/ethnicity and gender groups regardless of weight status. After controlling for relevant health and demographic factors, analyses revealed obese status to be unrelated to screening behavior among stratified groups (gender by race/ethnicity), with all confidence intervals containing one and thus non-significant. This is in contrast to a study by Anderson and colleagues [15] who offered colonoscopy and navigation to uninsured patients of heterogeneous race and ethnicity and reported higher rates of non-adherence among obese participants.

These findings contribute to a growing literature examining the association between body weight and CRC screening. Several researchers have reported an inverse relationship between body weight and CRC screening rates, most notably amongst female participants [14, 24]. In a study of female participants, Leone and colleagues [16] reported that obese white women had significantly lower screening rates than non-obese white peers, and a non-significant trend suggestive of higher screening rates among obese African American women. It has been suggested that such results could be associated with differences in normative cultural attitudes towards weight, with evidence suggesting that higher weights may be more acceptable in African American culture [25]. Inconsistencies in the literature still remain however, with further studies noting obesity to be unrelated to CRC screening behavior [17, 18], as in this patient navigation study.

It is important to place the reported null findings within the context of the study sample and design. Patient navigators play a critical role in promoting screening adherence and addressing personal and structural barriers to engagement. Although navigators did not specifically address body weight as an issue with participants, it is possible that the support, guidance, and reminders provided as part of the current study mitigated the influence of excess weight. This is particularly relevant given the average BMI of the study sample was in the obese range (31.7 kg/m²). In addition, participants were recruited from a primary care

clinic, were already in contact with a health care provider, and had accepted a screening referral, which has been noted as an important predictor of follow-up behavior, particularly among African American women [16]. Thus, it must be noted that the impact of a provider screening referral on follow-up could not be investigated in the current study. Further, excess weight may serve as a barrier to initial engagement in health care or in different referral patterns by PCPs and thus individuals in the current study may represent a qualitatively different patient group than those surveyed outside of a primary care setting.

The study from which this analysis was drawn was not designed to specifically investigate the impact of excess weight on screening behavior in the context of patient navigation and thus these results should be considered with caution. Further, and in contrast to many studies in this domain, our design precluded white patients and thus comparisons were conducted using within group referents (obese vs. non-obese). Finally, it should be noted that the sample size of the current study may not have been sufficient to detect differences between groups and thus there is a need for caution and further investigation. Despite these caveats, these results provide a novel contribution to an emerging literature on this important topic, and provide fertile ground for future investigation of obesity, screening and the role of navigation in removing barriers to health care engagement.

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Table 1
Summary of Demographic and Health Characteristics (N=520)

Demographic Characteristics		Health Characteristics	
Gender		Smoking*	
Male	30%	Current Smoker	24%
Female	70%	Smoking History	48%
Age		Family History of CRC	
Range	49-86	Yes	7%
Mean (SD)	58.9 (7.4)	Comorbid Conditions	
Ethnicity		Mean (SD)	3.2 (2)
Latino	52%	Range	0-12
Race		BMI (kg/m ²)	
African American	48%	Mean (SD)	31.9 (7.8)
Annual Income*		Range	18.7-66.7
<\$10,000	42%	BMI Grouping	
\$10,000-\$24,999	26%	18.5-24.9	17.5%
\$25,000-\$49,999	16%	25-29.9	29.0%
Marital Status*		30-34.9	25.6%
Married/Partnered	24%	>35	27.9%
Single/Without			
Partner	75%		
Education			
Less than HS			
graduation	43%		
HS grad or higher	57%		
Employment*			
Employed	31%		
Retired	34%		
Insurance Type*			
Medicare/Medicaid	80%		
Private/Self	20%		

* Data not available for all patients, percentages based on total sample.

Table 2
Adjusted Regression Analyses Predicting Completion of Colonoscopy by Obese Status
(N=520)

Group	Weight Status	OR	95% CI
African American men* (N=81)	Non-Obese (N=45)	1.0	Reference
	Obese (N=36)	2.17	0.66-7.08
African American women* (N=167)	Non-Obese (N=61)	1.0	Reference
	Obese (N=106)	0.65	0.28-1.52
Latino men^ (N=74)	Non-Obese (N=45)	1.0	Reference
	Obese (N=29)	1.21	0.39-3.78
Latino women (N=198)	Non-Obese (N=91)	1.0	Reference
	Obese (N=107)	0.60	0.27-1.31

Obese status defined as BMI ≥ 30 vs. BMI 18.5-29.9 kg/m². Analyses conducted controlling for income.