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Preventive health behaviors among low-income African American and Hispanic populations: Can colonoscopy screening serve as a teachable moment?

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Abstract

Introduction—Teachable moments (TMs) are situations with potential for promoting health behavior change. Little is known as to whether colonoscopy screening itself may serve as a TM, particularly among low-income or minority populations. Research in this area is needed to inform efforts to address the disproportionate burden of colorectal cancer (CRC) experienced by minorities.

Aims—This study aims to describe attitudes related to physical activity (PA) and healthy eating among a low-income Hispanic and African American sample; assess whether colonoscopy completion may encourage changes in dietary behavior or PA; and determine the type of interventions minority participants would prefer to promote preventive behaviors.

Methods—Average-risk African American and Hispanic individuals referred for a screening colonoscopy at a Primary Care Clinic between May 2008 and December 2011 were eligible. Data were collected at three time points: at recruitment, two weeks before their colonoscopy, and one month after their colonoscopy (n=537).

Results—The difference in change in PA from baseline to post-colonoscopy follow-up between those who had a colonoscopy and those who did not was significant (p=.04). Those who completed a colonoscopy increased their PA .26 days on average, whereas, those who did not have a colonoscopy decreased their PA by .46 days.

Discussion—Findings suggest that the time following colonoscopy completion may be ideal to provide health promotion for PA and healthy eating. Future research is needed to explore the

mechanisms that influence health behavior change as a result of colonoscopies to inform the development of interventions in this area.

INTRODUCTION

Teachable moments (TMs) are situations in which there is strong potential to motivate positive change in health behaviors [1]. It is also defined as naturally occurring health events that can prompt people to make health behavior changes [2]. TM has informed research on the effects of health events in the context of cancer prevention and control, including the impact of cancer diagnosis on smoking cessation and physical activity (PA) [3] and the impact of colon polyp diagnosis on health behavior change [4]. Lawson and Flocke (2009) reviewed the literature for key components of TMs and the essential elements that make up this phenomenon [5]. Examining literature, they found that TMs were often used in three instances: (1) in describing an “opportunity”; (2) an instance that leads to a behavior change; and (3) a cueing event that results in cognitive and emotional responses. For smoking cessation, McBride, Emmons, and Lipkus (2003) identified three characteristics that make health events a TM: (1) increases perceived personal risk; (2) raises strong emotional responses; and (3) redefines the individual’s self-concept or social role [4]. The concept underlying a TM is theoretically related to the construct of ‘cue to action’ in the Health Belief Model (HBM), in which an event or acquired knowledge influences the perceived threat or severity of a disease and could influence an individual’s health behavior [3].

In the literature, naturally occurring health events which constitute TMs include pregnancy, hospitalizations, and disease diagnoses [2–3]. Interventions have leveraged the TM of a cancer diagnosis to promote tobacco cessation and PA and healthy eating [6–8]. Another TM intervention aimed at promoting healthy eating and PA through tailored self-help materials, targeted patients who recently had a polypectomy to remove pre-cancerous colon polyps [4]. After the intervention, researchers found that a third of control participants dropped any of the related risk factors (e.g., smoking, sedentary lifestyles), whereas half of the intervention group dropped any of the related risk factors. Participants in the intervention were also more likely to change more than one health behavior compared to the control group. Similar to others studies in literature about TM, this study was conducted with participants who were majority white (82%) with incomes greater than $45,000 (57%).

Cancer screenings have also been shown to be TMs for other types of screenings such as promoting colorectal cancer (CRC) screening after undergoing breast and cervical cancer and prostate cancer screenings [9]. While much of the literature on TMs focuses on lifestyle changes that occur after disease diagnoses, limited research exists on how cancer screenings could serve as TM, especially among a racially diverse population.

It is widely known that diet and nutrition are linked in cancer. Most recently it was found that meat consumption, specifically processed meats, is linked to increased risk for CRC [10]. Obesity and excess body weight have also been known to be associated with CRC [11–12]. There is also growing evidence that a healthy diet and regular PA are potentially protective factors for cancer risk [13]. Specifically, it has been suggested that diets rich in fruits and vegetables could prevent CRC [13]. Colonoscopy screening in particular also

requires patients to use a laxative and make dietary changes prior to the exam, which may additionally prime them for making other dietary behaviors.

African Americans and Hispanics are disproportionately affected by the burden of CRC morbidity and mortality. African Americans have the highest incidence and mortality rates of CRC compared to other race/ethnic groups [14]. CRC is the third leading cause of cancer death among African American men and women. Compared to whites, CRC incidence is 27% higher in African American men and 22% higher in African American women. While Hispanics have lower CRC incidence and mortality rates than whites, they are less likely to be diagnosed with a localized stage which has implications in survival and morbidity [15]. Contributing to these statistics, African Americans and Hispanics have lower rates of CRC screening than whites and have been slower to adopt these behaviors than other groups [15].

The evidence that links diet and PA to CRC risk combined with the high incidence and mortality rates of CRC among minorities call for additional research on if and how much behavioral changes are naturally occurring after a colonoscopy among African Americans and Hispanics and how colonoscopy screenings could be leveraged to improve PA and healthy eating. Among a predominately low-income Hispanic and African American sample, this paper aims to:

1. Describe attitudes towards and engagement in PA and healthy eating;
2. Assess whether participation in colonoscopy screening is associated with improvements in healthy eating or PA; and
3. Examine interest in participating in a range of specific types of health behavior change interventions.

Although both Hispanics and African Americans have low rates of CRC screening uptake, we hypothesize that those who do decide to get a colonoscopy are thinking about their health and more inclined to change their health behaviors than those who do not complete the exam.

METHODS

Recruitment

Between May 2008 and December 2011, individuals who were referred by their primary care providers for a screening colonoscopy were recruited during a routine scheduled appointment to Mount Sinai's Primary Care Clinic. To be eligible, participants had to: 1) be 50 years of age or older; 2) be without any 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) or not be up to date with other recommended forms of CRC screening (e.g. FOBT, flexible sigmoidoscopy).

Primary care providers and medical assistants were told about the study and eligibility criteria, referred eligible patients to the study, and ordered the screening colonoscopy using electronic medical record. Participants who were interested met with a Research Assistant after their medical appointment to learn more about the study and provide informed consent.

This study was approved by the Institutional Review Board at Mount Sinai School of Medicine.

Study Sample

The two patient navigation studies of this sub-study enrolled 954 participants [16–17]. For this secondary analysis, 595 participants were included as they completed questions related to TMs at any time point. There were no statistically significant socio-demographical differences in participants included in our analysis compared to those not included.

Data Collection

Data was collected at three time points during the study. Baseline surveys were collected in-person at the time of consent. Follow-up data was collected about 1 month after the colonoscopy (or about 1 month after a no-show appointment). Each survey took about 20–30 minutes and participants were compensated with a $20 gift card per assessment.

MEASURES

Demographic and Medical Characteristics

The baseline socio-demographic questionnaire included age, race/ethnicity, employment status, income, marital status, education, country of origin, and family history of CRC. Chart reviews were conducted one year after baseline to abstract BMI (based on height and weight), insurance type, comorbid conditions and smoking status at baseline and colonoscopy completion status.

Teachable Moments Questions

Attitudes towards preventive behaviors—Questions related to TMs comprised of six statements with Likert-scale responses from strongly disagree to strongly agree. These statements are related to participant's attitudes on feeling more motivated to have a healthier lifestyle after the colonoscopy preparation procedure, perceived importance of exercising to stay healthy, interest in participating in a PA program, perceived importance of eating healthy, interest in healthy eating program, and interest in programs on cancer screening.

Behavioral outcomes—To assess health behaviors, two questions related to days per week the respondent completed the recommended amount of PA and consumed the recommended amount of fruit and vegetable were asked: 1) How many days a week do you get at least 30 minutes of moderate or strenuous exercise? For example, it makes you breathe hard or sweat, like playing sports, jogging, or dancing? 2) In an average week (7 days), how many days do you eat at least 5 fruits and vegetables?

Statistical Analyses

All statistical analyses were conducted using SPSS Version 19. Chi-squared analyses were used to assess possible associations between changes in physical activity and healthy eating and colonoscopy completion. Logistic Regression was used to further explore these relationships and control for possible confounders.

RESULTS

Sample Characteristics

The mean age of the sample was 59.0 (SD: 7.3; range: 50–84). Nearly 70% of the sample was female and nearly 80% were insured with Medicare or Medicaid. About 40% had less than a High School education, and almost half (46.9%) had a yearly household income of $10,000 or less per year. About half of the sample identified as African American, 36.6% were Hispanic, and 10.8% were White or other. Most Hispanics were Puerto Rican (57.1% of Hispanics), Dominicans (16.6% of Hispanics), or Central/South Americans (9.7% of Hispanics). Of Hispanics born outside of the U.S. (37.9%), the mean number of years in the U.S. was 34.4 (SD: 15.3), ranging from a minimum of 0 and a maximum of 72. The majority of all participants (92.6%) reported having a regular healthcare provider. Table 1 has complete information about the study sample.

Attitudes towards healthy eating and PA

At baseline, 47.0% of participants ‘agreed’ and 49.9% of participants ‘strongly agreed’ that it is important to exercise to stay healthy. Similarly, 41.2% of participants ‘agreed’ and 57.2% ‘strongly agreed’ that it is important to eat healthy foods in order to stay healthy. At follow-up, 49.0% of participants ‘agreed’ and 41.5% ‘strongly agreed’ that they feel more motivated to have a healthier lifestyle after taking laxatives and having a colonoscopy. In addition, 54.6% of participants ‘agreed’ and 30.8% ‘strongly agreed’ that if a PA program was offered to them at that time, they would participate. Similarly, 52.3% of participants ‘agreed’ and 35.3% ‘strongly agreed’ that if a program to support healthy eating were offered to them at that time, they would participate. Finally, when asked if a program to learn about other cancer screening tests was offered to them at this time, 58.3% of participants ‘agreed’ and 30.5% of participants ‘strongly agreed’ that they would participate.

Participation in healthy eating and PA

At baseline, the mean days of getting at least 30 minutes of moderate or strenuous exercise per week was 3.16 (SD: 2.7; median: 3. Participants also reported a mean number of 3.76 (SD: 2.6; median: 3) days a week when they eat at least 5 servings of fruits and vegetables a day. At baseline, about two-thirds (66.3%) reported getting 0–4 days of exercise per week and about half (51.4%) of participants reported three or fewer days a week of eating at least five servings of fruits and vegetables per day. The mean BMI of the sample was 31.4 at baseline (collected via chart review), with 52.1% of the sample being obese and 32.8% of the sample being overweight (see Table 2).

At follow-up (one month after colonoscopy), the mean days of exercise per week was 3.32 (SD: 2.4; median=3). Participants reported a mean number of 3.90 days a week (median=4) when they ate at least 5 fruits and vegetables a day). At follow-up, 67.9% of respondents reported getting 0–4 days of exercise per week, and 46.7% of participants reported three or fewer days a week of eating 5 servings of fruits and vegetables. Using chart review, 80.5% of the sample had received a colonoscopy (n=479) (see Table 2).

Associations between colonoscopy screening, PA, and healthy eating

There was no bivariate association between colonoscopy screening completion and reported days of exercise at follow-up (p=.554) or between screening completion and fruit and vegetable intake (p=.326) at follow-up. In bivariate associations, there was a significant difference in the change in exercise between baseline and follow-up between those who had a colonoscopy and those who did not (p=.04). On average, participants who received a colonoscopy had a change in PA of .26 days, while those who did not get a colonoscopy had a change in PA of −.46 days. In other words, those who had a colonoscopy increased their PA .26 days on average, whereas, those who did not have a colonoscopy decreased their PA by .46 days. In a multivariable model, controlling for covariates that were significant in bivariate models, adjusting for insurance and employment status, participants who completed their colonoscopy have a .13 higher odds in increasing exercise days than those who did not complete (p=.02) (see Table 3). We found a non-significant difference in change in fruit and vegetable consumption (between baseline and follow-up) between those who had a colonoscopy and those who did not (p=.15).

Interest in related health behavior change programs

When we asked participants about their preferences for participating in health behavior change programs at follow-up (related to exercise, healthy eating, and cancer screening), education and support from health care professionals were most popular (95% of participants would be interested), followed by assistance from a patient navigation program (92.6%), education and support from peer navigator (92.1%), print materials (90.3%), and home-based programs (85.3%). Educational workshops, video/DVDs, support groups, phone counseling sessions, and community-based programs were also relatively popular (see Table 4). Somewhat less popular among this sample were internet-based health education programs (51.1%) and other computer-based programs (e.g., CD-ROM) (49.2%). Other write-in suggestions included: online chat, email, friends and networks in the community, magazines/TV/radio/mail, and community senior center/YMCA workshops or programs.

DISCUSSION

Our findings are in line with previous research on TM and cancer screenings. Baker and Wardle (2002) found that patients who underwent a flexible sigmoidoscopy and an intervention on healthy eating on average increased their daily fruit and vegetable consumption by 1.06 servings [18]. Similar to our findings, participants reported a high degree of interest in participating in the intervention and requests for more information—suggesting that cancer screening centers could be a suitable setting for behavior change interventions. In contrast to our results, another study on flexible sigmoidoscopy evaluated lifestyle changes in a randomized control trial comparing those were screened to unscreened controls [19]. At the 3-year follow up, the authors found that the unscreened controls reported a statistically significant decrease in smoking, increase in PA, and increase in daily fruit and vegetable intake. These results led to their conclusion that undergoing a flexible sigmoidoscopy could have a “health certificate effect” on participants. They argued that CRC screening could lead to negative lifestyle changes because it gives individuals a false

assurance of being healthy, therefore, those who undergo colonoscopies could continue to practice risky behaviors if their colonoscopy results are normal.

Another study by Hubbard and colleagues (2014) assessed health behavior changes after colonoscopy [20]. Ten months after their colonoscopies, patients increased amounts of less intensive-levels of PA (i.e., less than 30 minutes of moderate exercise at least 5 day of the week) by 8%. Those who reported low levels of PA at baseline, were male, and were older in age were more likely to report low levels of physical at follow-up. They argued that undergoing colonoscopy could lead to more sedentary behaviors; however, their results indicate that patients who reported sedentary behaviors at baseline are more likely to maintain the same amount of less intensive-levels PA [20].

These varying findings along with the ones presented in this study suggest that further research is needed to explore the mechanisms of behavior changes following colonoscopy completion. It also calls for additional research on potential differences in behavioral changes based on screening modalities (e.g., colonoscopy vs. FOBT). Although results related to lifestyle changes vary, it could be argued that screened individuals are more receptive to health education and screening exams present opportunities for ideal timing for health promotion. Currently, there are no evidence-based approaches to providing health promotion and ensure that participants are considering primary prevention after undergoing screening exams [21]. It is also important to note the demographic characteristics of the sample of past interventions and studies in the TM literature. Past studies evaluating TM have targeted higher socioeconomic individuals with less than 30% reporting low income or economic hardship [18, 20]. They have also targeted primarily white individuals or do not report on race/ethnicity at all [18–20]. Given that rates of colonoscopy screening are increasing among some racial/ethnic groups [22], more research is needed to understand how we might be able to maximize this opportunity to facilitate other preventive behaviors.

CONCLUSION

This present study is not without limitations. Measures of exercise and amount of fruit and vegetable consumption were self-reported and BMI was only collected at baseline; therefore, self-reported exercise at baseline and follow up were used as a proxy for behavior change. Changes in diet and PA were only assessed in short-term (one month after colonoscopy); future research should explore the long-term lifestyle changes after an individual undergoes CRC screening. It is possible that participants who reported an increase in their PA and fruit and vegetable consumption reverted back to their old health behaviors. This would further suggest that there is an ideal time (TM) to engage individuals after colonoscopy completion. Another limitation is that colonoscopy results (e.g., polyp findings) were not evaluated as a potential predictor of behavior changes. Additionally, because healthier and more motivated individuals are more likely to complete the colonoscopy, the changes in their self-reported PA may affected by selection bias. Attrition could have also affected our findings as we do not have follow-up data or chart review information from participants who dropped out of the study after completing the baseline survey. However, based on the demographics collected at baseline, those who completed follow-up data did not differ from those who were dropped out of the study. Lastly, the small effect seen in the results could limit its

interpretation. Although the average reported change in exercise is minor, .26 days equates to 5.24 hours. It has been shown that any positive change in PA could have a positive impact on colorectal cancer risk and other chronic diseases [22]. An addition of five hours of PA per week could potentially decrease cancer risk significantly. Lastly, because the data were collected between 2008 and 2011, preferences for mobile and Internet types of interventions may have changed in recent years.

Despite the abovementioned limitations, this study has notable strengths. Research on TMs often focuses on how cancer diagnoses are ideal for primary prevention (i.e., lifestyle changes such as diet and PA) or how screening exams could provide ideal timing to promote other screening exams. This study contributes to the literature by describing how colonoscopy completion (a secondary prevention) could serve as a TM for primary prevention. Furthermore, the results of this study are quantified in days of meeting recommended amounts of PA and fruit and vegetable consumption per week instead of self-reported changes reported at a point-in-time. Lastly, this study was conducted with primarily racial/ethnic minority and low-income individuals.

Further research is needed to explore the mechanisms behind behavior changes that naturally occur after colonoscopy completion. Results from this study suggest that colonoscopy completion may be an ideal time to deliver health promotion interventions and the study sample reported high interest in receiving health promotion. As a result, future studies should also explore interventions that leverage this TM at cancer screenings. Behavior change interventions, especially those related to the disease, could be combined with screenings. For example, health education materials about the link between CRC and healthy eating could be given to patients after they complete their colonoscopy. Because past research with health care providers found that providers are unsure about the appropriate timing for behavior change messages and how much patients are willing and ready to change their behaviors, a multi-level intervention that trains providers and target patients is important to fully leverage the TM [23]. These providers could include gastroenterologists for CRC screenings, radiology technicians for mammograms, and obstetricians for cervical cancer screenings.

Lastly, the amount of interest in related health behavior change programs at follow-up is also promising. A vast majority of participants reported being interested in all behavior change programs except Internet-based health education programs and other computer-based programs such as CD-ROM. Future research should explore these different types of behavior change programs in leveraging this TM.

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Table 1

Sociodemographic characteristics among the sample at baseline (n=595)

	N	%
Gender		
Male	195	32.8%
Female	400	67.2%
Insurance		
Medicare	166	27.9%
Medicaid	315	52.9%
Private/self-pay	114	19.2%
Age		
Under 65	451	75.8%
65+	144	24.2%
Marital status		
Married/living with partner	158	26.7%
Single/living without partner	434	73.3%
Employment		
Work full-time	138	23.2%*
Work part-time	47	7.9%*
Retired		
No	363	63.8%
Yes	206	36.2%
Education		
Less than HS graduate	235	39.6%
HS graduate or more	358	60.4%
Income		
Less than $10,000 per year	249	46.9%
$10,000 or more per year	282	53.1%
Race/Ethnicity		
African American	276	46.5%
Afro-Caribbean, African American Latino, African	36	6.0%
Asian, White, Other	35	5.9%
Hispanic	217	36.6%
Multi-racial	29	4.9%
Years in the U.S. among those born outside of U.S. (n=226)		
0–15	22	9.7%
16–30	80	35.4%
31+	124	54.9%
Have Regular Healthcare Provider		
Yes	549	92.6%

	N	%
No	44	7.4%
Family history of cancer		
Yes	345	58.1%
No	249	41.9%

*Among those who are employed

Table 2

Health status and preventive health behaviors among the sample at baseline (n=595) and follow-up (n=537)

	Baseline	Follow-up
Days a week getting at least 30 minutes of moderate or strenuous exercise		
0	168 (29.3%)	102 (19.4%)
1	25 (4.4%)	32 (6.1%)
2	63 (11.0)	69 (13.1%)
3	89 (15.5%)	106 (20.1%)
4	35 (6.1%)	49 (9.3%)
5	43 (7.5%)	52 (9.9%)
6	13 (2.3%)	14 (2.7%)
7	137 (23.9%)	103 (19.5%)
Days a week eating at least 5 servings of fruits and vegetables a day		
0	99 (17.4%)	53 (10.0)
1	26 (4.6)	23 (4.3%)
2	69 (12.1%)	66 (12.5%)
3	99 (17.4%)	105 (19.8%)
4	43 (7.5%)	67 (12.7%)
5	59 (10.4%)	83 (15.7%)
6	8 (1.4%)	12 (2.3%)
7	167 (29.3%)	120 (22.7%)
Weight status		
Normal (BMI less than 25)	68 (15.1%)	NA
Overweight (BMI 25–29.9)	148 (32.8%)	NA
Obese (BMI >= 30)	235 (52.1%)	NA
Colonoscopy screening status		
Yes	NA	479 (80.5%)
No	NA	116 (19.5%)

Table 3

Multivariable Model examining association between completion of colonoscopy screening (exposure) and change in physical activity (outcome) (n= 326)

Colonoscopy Screening		**p=.021**
No	REF	
Yes	.13 (.44)	
Insurance		p=.084
Medicaid/Medicare	REF	
Private insurance/self-pay	−.11 (.36)	
Employment		p=.249
Retired	REF	
Work Part-time or Full-time	−.7 (.33)	

Table 4

Participant preferences for related health behavior change programs at follow-up (n=537)

	N	% interested
Education and support from health care professional	508	95.0%
Assistance from a patient navigation program	490	92.6%
Education and support from peer navigator	488	92.1%
Print materials	483	90.3%
Home-based program	452	85.3%
Educational workshop	442	84.7%
Video or DVD	435	81.8%
Support Group	432	81.8%
Phone counseling sessions	427	81.5%
Community-based program	412	78.6%
Internet-based health education program	273	51.1%
Other computer-based program (e.g. CD-ROM)	261	49.2%