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Evaluating the impact of an educational intervention to increase CRC screening rates in the African American community: A preliminary study

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Abstract

BACKGROUND—Despite the acknowledged importance of colorectal cancer (CRC) screening, and its proven prognostic benefit, African American men and women simultaneously possess the highest rates of CRC related incidence and mortality (1) and lowest screening rates in the United States (2). Effective, targeted interventions that promote CRC screening for this community are therefore critical. The current study evaluated the impact of a print-based educational intervention on screening behavior and associated patient-based factors; including cancer-related knowledge, fatalism, worry and decisional balance (pros-cons).

METHOD—118 individuals (Mean Age = 56.08 years, $SD = 5.58$) who had not undergone screening were recruited from two health clinics in New York City. Each participant received educational print materials regarding the need for screening, the process of undergoing screening, and the benefits of regular CRC screening.

RESULTS—One in four individuals had undergone post-intervention screening at a three-month follow-up. Whereas all participants reported a decrease in cancer-related worry ($p < .05$), it was a decrease in fatalism ($p < .05$) and an increase in decisional balance ($p < .05$) that was associated with post-intervention screening behavior.

DISCUSSION—These preliminary results suggest that fatalistic beliefs and an individual's assessment of the benefits and barriers of screening may be critical in the decision to undergo CRC screening. Future interventions to increase CRC screening rates for this community may be improved by focusing on these patient-based factors.

Keywords

Colorectal cancer screening; African Americans; cancer prevention

Colorectal cancer (CRC) remains the third most frequent cancer diagnosis, and the second most frequent cause of cancer-related mortality in the United States (3). Importantly, early detection of pre-cancerous and cancer cells through regular screening can significantly improve the five-year survival prognosis to in excess of 90% (3, 4); while a significant proportion of deaths from CRC could be avoided in individuals over the age of 50 (5).

Despite the acknowledged benefit of screening, and the proven prognostic benefit of early detection of pre- or cancerous cells, screening rates remain low throughout the United States.

Recent estimates indicate that less than half of those who fall within recommended screening guidelines are being screened (1, 2). These estimates are even lower for African American men and women (1), a group who also possess the highest rates of CRC related incidence and mortality (6). Given these statistics, and the potentially preventable nature of CRC-related morbidity and mortality, it is critical that barriers to screening be identified and effective interventions to increase screening participation be developed and implemented (7, 8).

Interventions to promote cancer screening have typically focused on two primary pathways of change: psychosocial interventions designed to educate individuals as to the benefits of cancer screening and reduce fear, mistrust and fatalism (9, 10); and those focused on the behavior of primary-care physicians and their interaction with patients (11, 12). Unfortunately, despite a significant body of literature dedicated to this domain of research, CRC screening interventions have reported a mixed degree of success and consequent screening rates have remained low. Importantly, there have been relatively few interventions specifically designed to address CRC screening behavior in diverse and underserved populations, including the African American community (13). Those interventions that have been evaluated have focused upon both psychosocial support and education (14–19) and physician-orientated education (20, 21), and reported a similarly mixed degree of success. There is consequently a distinct need for the development and evaluation of effective interventions aimed at both health-care providers and patients (22).

Barriers to Screening and Targets for Change

Research has identified a number of potential barriers to routine CRC screening for African Americans (7, 23) that may be amenable to change through education-based interventions. The adoption of cancer screening guidelines has been identified as a decisional process by which an individual will consider the benefits (pros) and costs (cons) of a potential course of action. The importance of this ‘weighing’ of perceived benefits and costs has been identified in empirically-based models such as the Theory of Reasoned Action ((TRA) 24, 25) and the Transtheoretical Model of Change. ((TTM) 26, 27) and associated with cancer-screening behavior, most notably in regard to mammography screening (28–33). Such studies suggest that the identification of greater number of benefits than barriers, and thus a more positive decisional balance, is associated with greater likelihood to undergo screening. Whereas similar findings have been reported by Trauth and colleagues (34) in their investigation of CRC screening behavior, a recent review of the literature by Spencer and colleagues (35) concluded that further research is needed in the application of TTM and the decisional balance construct to CRC screening.

Increasing an individual’s awareness of screening guidelines and the importance of undergoing regular screening has been identified as a critical component of educational interventions. A recent study by McAlearney and colleagues (36) indicated that African American women were significantly less likely to have had a colonoscopy than white women, and reported significantly less knowledge regarding guidelines and CRC screening. Powe, Ntekop and Barron (18) evaluated the impact of a culturally relevant intervention on cancer related knowledge and participation in CRC screening (fecal occult blood testing (FOBT)) in a group of predominantly elderly African American men and women. Across all groups, increased knowledge of CRC and cancer screening guidelines was associated with increased likelihood of undergoing screening in the 12-month study period.

An individual's degree of cancer-related worry has also been associated with screening behavior. However, this complex factor has been shown to be able to both facilitate and inhibit cancer-screening behavior (37, 38). In a meta-analytic review of the role of worry in breast cancer screening, Hay and colleagues (39) identified a small but reliable association between higher degrees of worry and greater likelihood to undergo screening. Whereas there exists a paucity of research pertaining to the role of worry in the adoption of CRC screening in the African American community, Brenes and Paskett (40) reported similar findings, with higher levels of worry associated with greater readiness to undergo CRC screening in a study of predominantly low-income African American women.

Cancer-related fatalism, or the belief that the detection of cancerous cells and consequent diagnosis of cancer will result in death (41), has received considerable empirical attention. Such a belief structure has been associated with a reduced propensity to engage in health promoting behaviors, including cancer screening (42), beyond that of poverty, health care access and education (43). This has been particularly noted within underserved communities (41) and has demonstrated negative correlations with cancer-related knowledge, income and education background (44, 45). Importantly, fatalistic cancer beliefs may be amenable to change (46) and have therefore constituted a critical component of interventions designed to promote routine mammography cancer screening (47–50). In a study of elderly African American and Caucasian individuals, Powe and colleagues (45) distributed FOBT kits to participants and assessed their use in relation to a range of demographic predictors and fatalistic beliefs. It was found that only fatalism was a significant predictor of which individuals participated in FOBT screening. Further research by Greiner and colleagues (51) reported that individuals who reported a greater level of mistrust and fear of the medical establishment, as well as less knowledge and more fatalistic attitudes in regard to cancer, were significantly less willing to undergo routine cancer screening.

This preliminary study will seek to evaluate the impact of a print-based educational intervention on cancer screening behavior and a number of associated patient-based factors, including CRC-related knowledge, worry, decisional balance and fatalism. It is hypothesized that individuals who undergo post-intervention CRC screening (colonoscopy, FOBT, flexible sigmoidoscopy) will report significant increases in cancer-related knowledge and decisional balance (endorsement of a greater number of benefits than costs associated with cancer screening), and a significant reduction in fatalistic beliefs associated with cancer. In acknowledgement of the limited and conflicting research that exists in regard to the role of cancer-related worry in cancer screening, this factor will remain exploratory.

Method

Participants

There were 118 self-identified African American participants recruited from two primary care sites in New York City. The mean age of participants was 56.08 years ($SD = 5.58$). The majority of individuals were women (75.4%), identified themselves as unemployed or retired (85.6%), and lived alone (75.4%). 65.8% of participants reported earning less than \$15,000 per annum, while more than half of those who participated (70.3%) reported completing high school. There were no significant differences established in the demographic details of those individuals who completed both phases of the current study and those who completed only the first phase ($N=43$). The current study was approved by the Institutional Review Board of both participating institutions and all individuals were treated in accordance with the Ethical Standards of the American Psychological Association.

Measures

Knowledge about CRC and CRC Screening Procedures—This measure contains eighteen questions that assess three domains of knowledge associated with CRC and screening procedures. Questions address general CRC knowledge, knowledge of CRC screening guidelines and knowledge of screening procedures (e.g. “The reason a doctor would ask someone to have a colonoscopy is to....”). Participants receive a point for correctly answering each face-valid question, which are summed to create a knowledge score. Higher scores represent greater knowledge of CRC and CRC screening (52).

Worry—This three-item questionnaire was used to assess each participant’s level of fear and worry concerning CRC screening. Participants were asked to rate each statement on a five-point likert scale ranging from ‘Not at all’ to ‘Definitely’. Questions included “I am afraid of having an abnormal screening test result” “I am worried that screening will show I have colorectal cancer or polyps” and “I am bothered by the possibility that screening might be physically uncomfortable” (53).

Perceived Pros and Cons of CRC Screening (Decisional Balance)—This scale consists of nine benefits (pros) (e.g. “Colorectal cancer tests are safe), and nineteen barriers (cons) (e.g. I cannot afford to have a colorectal cancer test) that participants were asked to rate on a five-point likert scale ranging from ‘Not at all’ to ‘Definitely’. Similar findings were established at both time points in the current study, with alpha of .72 for Pros and .81 for Cons. These are consistent with previous research findings (52). Decisional balance was established through subtracting individuals’ cons score from their pros score, with a more positive score indicative of a greater focus on pros and a more negative score indicative of greater focus on cons.

Fatalism (Attitudes about Cancer)—Fatalism was assessed using the fifteen-item Powe Fatalism Inventory (45). Participants are asked to indicate whether they agree or disagree with each fatalistic statement (for example ‘I believe if someone gets colorectal cancer, their time to die is near’) regarding cancer on a dichotomous ‘Yes’ or ‘No’ scale. Individual’s responses are then added to provide an indication of their overall level of agreeance with the fatalistic statements, with higher scores indicating a greater degree of fatalistic beliefs. Alphas were adequate at both time Time 1 (.83) and Time 2 (.84).

Procedures

Patients who had scheduled a non-acute physician appointment were screened for inclusion in the study at both sites. Individuals who identified themselves as African American, were over the age of 50, had never had a colonoscopy or sigmoidoscopy and possessed telephone service were identified for inclusion. Exclusion criteria included personal or first-degree relative history of colorectal cancer, personal history of a chronic gastrointestinal disorder or the inability to communicate in English. Clinic staff approached identified individuals with informational flyers regarding the study, followed by a research assistant who explained the study and gathered consent if the patient was interested. Those who consented to involvement in the study were interviewed and questions from each measure read aloud and responses recorded.

The intervention assessed in the current study involved the administering of educational print materials regarding CRC screening to participants. Participants received either a standard brochure from the Center for Disease Control or a brochure developed and designed by the authors. Educational materials were culturally targeted and stage matched and developed based on input from focus groups. All brochures were based on an 8th grade reading level and were either two, three or four-paneled (back and front print) with

appropriate illustrations (54). Each brochure provided information regarding types of screening for CRC with an emphasis on colonoscopy. For those patients who consented to involvement in the study, print materials regarding CRC screening and guidelines were placed in their medical file. Before each patient was to see their physician, their physician was informed "their patient had agreed to be part of a research study on colorectal cancer screening and African Americans. Could they please give him/her this brochure and tell them that you recommend colorectal cancer screening". A two-week follow-up call ensured that the protocol had been followed and that they received the relevant educational information. Participants were compensated twenty dollars for their involvement with each interview.

Follow-up interviews three months later (Time 2) were conducted by phone or in-person and took approximately 30 minutes to complete. Once again, questions were read aloud by a trained research assistant. A random sampling of 10% of tape-recorded phone interviews were evaluated during the follow-up period for adherence to study procedures. Any non-adherence to study procedure was addressed with research staff at weekly meetings.

Results

Preliminary analysis of statistical assumptions revealed no significant departures from normality, thus analysis of intercorrelations and post-intervention change proceeded as planned. Further analysis revealed no significant differences across the four factors being investigated between those individuals who completed both phases of the current study and those who completed only the first phase.

Intercorrelational analysis between factors at Time 1 and Time 2 revealed a number of significant associations in the expected direction, as well as changes from Time 1 to Time 2. For those who underwent post-intervention CRC screening, a number of non-significant associations were reported as significant at Time 2. This included a negative correlation between fatalism and both knowledge and decisional balance, as well as a positive correlation between knowledge and decisional balance.

Repeated measures analysis examined post-intervention change in two groups; those who had undergone screening and those who had not at three-month follow-up. Analysis revealed no significant differences *between* the two groups at either time point across the four factors examined. A number of significant changes in pre and post-intervention assessment were revealed, with participants' fatalistic beliefs and decisional balance differentiating between screened and non-screened groups. A significant reduction in fatalistic beliefs, and increase in decisional balance, was established only in the screened group, while both groups reported significant decrease in cancer-related worry. Whereas knowledge increased for both groups, this change was significant only for those who had not undergone post-intervention screening.

Exploratory examination of group response patterns using independent sample t-tests revealed no significant differences in mean responses to items regarding cancer-related worry and knowledge. There were however two notable differences observed in participants' responses to questions regarding fatalism and the benefits and barriers of screening. At follow-up, participants who underwent screening endorsed the item 'I believe getting checked for colorectal cancer makes people scared that they may really have colorectal cancer' significantly less (30% versus 50%) than individuals who had not undergone screening at follow-up. No significant difference was found at baseline between these groups. Further analysis of the benefits and barriers questionnaire revealed a significant difference between groups at follow-up, which did not exist at baseline

measurement. Individuals who had undergone screening at follow-up reported a significantly lower average endorsement of the item 'having a colorectal cancer test is very embarrassing' than those who had not undergone screening ($t(116) = -2.218, p < .05$).

Discussion

This preliminary study sought to evaluate the impact of an educational patient-based intervention to promote CRC screening in the African American community. The three-month follow-up revealed that nearly 25% of participants had undergone CRC screening (colonoscopy, FOBT, flexible sigmoidoscopy) since the intervention, with a number of patient-based factors distinguishing the two groups. As hypothesized, those individuals who underwent post-intervention screening reported a significant reduction in fatalistic beliefs and a significant increase in decisional balance (endorsement of a greater number of benefits than costs associated with cancer screening). Contrary to expectations, post-intervention screening was not associated with a significant increase in cancer-related knowledge, while both groups in the current study reported a significant reduction in CRC-related worry at follow-up. These results provide preliminary support for the importance of an individual's fatalistic beliefs and decisional balance in their decision to undergo CRC screening, and thus may inform the development of more effective educational interventions for African Americans.

Cancer-related fatalism was significantly reduced at follow-up for those individuals who had undergone CRC screening post-intervention. This result is consistent with previous findings in the screening intervention literature (46, 47) and in CRC screening specifically (45, 51). Importantly, fatalism may form part of an individual's broader belief structure, incorporating not only cancer-related beliefs, but also those associated with spirituality, control and determinism. Whereas these beliefs may therefore be more resistant to change, it is also possible, based on the current results, that a shift in an individual's fatalistic beliefs may exert a significant impact on behavior change.

For example, Powe (41) posited that individuals' fatalistic beliefs are not an all-or-nothing phenomenon, and thus research must seek to identify the point at which these beliefs exert influence upon health-related behaviors, such as adopting screening guidelines. Exploratory examination of individuals' response patterns revealed a notable difference in fatalistic attitudes associated with post-intervention screening behavior. Whereas there were no significant differences at baseline, individuals who proceeded to undergo post-intervention CRC screening were significantly less likely to endorse the statement 'I believe getting checked for colorectal cancer makes people scared that they may really have colorectal cancer' at follow-up assessment. The role of fear in influencing cancer screening behavior has been acknowledged and explored within a range of settings (55, 56), including for African Americans (51, 57) who in one study reported that over one third of African Americans sampled reported fear of finding out bad news as a barrier to screening (58). Patient based interventions may need to therefore promote greater awareness of the screening procedure in order to reduce fear and enhance adoption of screening guidelines.

The current study also revealed that individuals who underwent post-intervention screening reported a significant increase in decisional balance, as represented by the increased identification of benefits and reduced identification of barriers associated with CRC screening. There was no significant change reported by individuals who had not undergone screening. The impact of an individual's evaluation of the benefits and barriers of screening has been widely documented across a range of health behaviors including CRC screening, as reviewed earlier, and is therefore reinforced by the current significant findings.

Finally, participants' level of cancer-related knowledge and worry were examined pre and post-intervention. Contrary to expectation, a significant increase in knowledge scores was observed in those who had not undergone screening, while no significant difference was found in those who had. Further investigation revealed that despite its statistical significance, in practical terms this was a relatively small change, amounting to a mean post-intervention increase of less than half of one question responded to correctly. A significant reduction in worry was observed in both groups and therefore did not differentiate those who did and did not undergo screening.

The results of the current study must be considered in light of its limitations. Firstly, it is important to note that participants were recruited from health care providers in large urban settings, consisted of 75% females and had a regular contact with a health care provider, and thus are not representative of the African American community in its entirety. Secondly, the focus of this preliminary study was to examine the differential impact of an educational intervention on patient based factors and their relationship with CRC screening behavior. It is acknowledged that one cannot say definitively whether the change in patient-based factors is the result of the study intervention, as hypothesized, or the result of undergoing CRC screening. Whereas this fact requires that caution be used in drawing conclusions, the information garnered from this change data provides important insights into what factors may be critical in promoting CRC screening in this community beyond that would be available in a single time point exploration.

In conclusion, this preliminary study sought to establish the impact of a pilot educational patient-based intervention to increase CRC screening rates in the African American community. A three-month follow-up found that nearly one in four individuals who participated in the intervention had undergone CRC screening. It was revealed that a significant reduction in fatalistic beliefs and increase in decisional balance differentiated those participants who underwent post-intervention CRC screening and those who did not, while participation was associated with a significant reduction in cancer-related worry for all participants. The current study therefore provides preliminary evidence that fatalistic beliefs and an individual's assessment of the benefits and barriers to screening may be critical in their decision to undergo CRC screening. Future development and evaluation of interventions to increase screening rates in this community may improve efficacy by focusing on these patient-based factors.

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Table 1
Mean, Standard Deviation and Analysis of Difference for Post-Intervention Screened (N=27) and Not Screened (N=91) Groups

	Time 1 Mean and SD	Time 2 Mean and SD	Analysis of Difference
Knowledge			
Screened	14.26 (2.05)	14.44 (2.12)	$t(26) = -.586, p = .563$
Not Screened	14.39 (2.01)	14.82 (1.89)	$t(88) = -2.477, p < .05$
Fatalism			
Screened	6.52 (3.94)	5.30 (3.65)	$t(26) = 2.114, p < .05$
Not Screened	5.18 (3.22)	5.46 (3.53)	$t(89) = -1.298, p = .199$
Worry			
Screened	8.12 (3.36)	6.78 (3.12)	$t(26) = 2.345, p < .05$
Not Screened	7.53 (3.19)	7.03 (2.97)	$t(84) = 2.143, p < .05$
Decisional Balance			
Screened	1.96 (13.06)	6.82 (10.18)	$t(25) = -2.171, p < .05$
Not Screened	2.84 (13.36)	3.60 (14.35)	$t(90) = -.663, p = .509$