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Community-Based Colorectal Cancer Screening in a Rural Population: Who Returns Fecal Immunochemical Test (FIT) Kits?

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Abstract

Purpose—To determine the return rate of community-delivered fecal immunochemical test (FIT) kits in a rural population and to identify significant predictors of returning kits.

Methods—Residents were recruited in 8 rural Kentucky counties to enroll in the study and receive an FIT kit. Of 345 recruited, 82.0% returned an FIT kit from the point of distribution. These participants were compared to the remainder relative to age, sex, marital status, having an annual income below $15,000, not graduating from high school, not having a regular health care provider, not having health care coverage, being a current smoker, indicating current overweight or obese status, and a scale measure of fatalism pertaining to colorectal cancer. Predictors achieving significance at the bivariate level were entered into a stepwise logistic regression model to calculate adjusted OR and 95% CI.

Findings—The return rate was 82.0%. In adjusted analyses, those indicating an annual income of less than $15,000 were 2.85 times more likely to return their kits (95% CI: 1.56–5.24; $P < .001$). Also, those not perceiving themselves to be overweight/obese were 1.95 times more likely to return their kits (95% CI: 1.07–3.55; $P = .029$).

Conclusions—An outreach-based colorectal cancer screening program in a rural population may yield high return rates. People with annual incomes below $15,000 and those not having perceptions of being overweight/obese may be particularly likely to return FIT kits.

Keywords

access to care; colorectal cancer screening; epidemiology; fecal immunochemical testing; health disparities

Colorectal cancer (CRC) is the second leading cause of cancer mortality in the United States and the second most common site of new cases of cancer in men and women.[1] The burden of CRC disproportionately falls on rural Americans.[2,3] Because CRC often is preceded by an adenoma, there is ample opportunity to prevent malignancy through screening.[4] Identification of early-stage cancers and precursor lesions that can be removed has led to a consistent decline in CRC incidence and mortality rates over the past 20 years.[5]

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The Guide to Community Preventive Services indicates that there is a need for further efficacy testing of interventions that reduce barriers to CRC screening. In particular, the guide recommends the use of fecal occult blood testing (FOBT) in "alternative settings or nonclinical settings."[6] A new form of FOBT, the fecal immunochemical test (FIT), presents some advantages over older tests because it does not require dietary or drug restrictions, and sample collection may involve less effort. Furthermore, FIT has demonstrated improved specificity over FOBT tests.[4].

FIT represents a novel approach to enhancing CRC screening, particularly in rural regions that lack health care access, as it lends itself to organized CRC screening programs. For example, a UK study mailed FOBT tests to patients aged 50–69.[7] Of the nearly 500,000 mailed FOBTs, 57% were returned. Similar but smaller studies have occurred in the United States.[4,8,9] However, studies have not assessed the utility of using a community-based outreach approach that involves direct staff contact with potential users of an FIT kit. Several forms of preliminary research are needed before this type of program is ready for widespread use, one of which is the determination of the rate of return. A second priority should be to determine who is most likely to return (and not return) kits. Given the multiple advantages of FIT,[10] and of using community outreach for rural Americans, we addressed this research question with that population as our target. Accordingly, the purpose of this study was 2-fold: (1) to determine the return rate of FIT kits provided to rural residents through direct contact and (2) to identify factors that predict the return of FIT kits.

Methods

Study Sample

Residents (N = 345) were recruited in 8 rural Kentucky counties to enroll in the study and receive an FIT kit, yielding a participation rate of 90.7%. Recruitment occurred in 8 economically distressed counties of rural Appalachia. Based on rural-urban commuting area codes,[11] 7 of these counties were ranked extremely rural (code of 10), with 1 being ranked less extreme in its rural classification (ie, code of 8). Eligibility criteria were: (1) being between 50 and 75 years of age (however, those 30 and older with a first-degree relative previously diagnosed with CRC were also eligible) and (2) reporting a previous CRC screening history that is not compliant with recommendations.

Recruitment methods included flyers posted in local health departments. Flyers described the FIT kit as a test to screen for CRC and noted that people enrolling in this study would be compensated for their time. Staff were trained to describe the FIT kit as a simple at-home test that can determine the presence of precancerous polyps. Participants were also recruited at community outreach events. Direct referrals were provided by local health departments. Additionally, project staff conducted outreach to senior citizen centers throughout the 8-county area and at health and wellness events sponsored by local employers.

Procedures

Participants completed a paper-and-pencil survey instrument prior to receiving instructions for specimen collection. Survey questions collected demographic and health information. All

study procedures were approved by the Office of Research Integrity at the University of Kentucky.

Measures

A 4-item scale assessed perceptions of fatalism regarding CRC. Items were: (1) “I am likely to develop colorectal cancer in my lifetime,” (2) “I am worried that I will develop colorectal cancer in my lifetime,” (3) “If it was meant for me to develop colorectal cancer there is nothing that I can do about it,” and (4) “There is nothing I can do to reduce my risk of developing colorectal cancer.” The scale produced an excellent interitem reliability coefficient (Cronbach’s alpha = .93). This measure has been tested and used previously with populations of rural Appalachians.[12]

Data Analysis

Associations between dichotomous correlates and return of FIT kits were tested using chi-square tests. Associations between continuous correlates and return were tested by independent group *t* tests. Correlates obtaining significance at the bivariate level were entered into a stepwise logistic regression model to calculate adjusted OR and their 95% CI.

Results

Of 345 participants, 82.0% returned an FIT kit to a staff member. The average age of the sample was 57.2 years (SD = 11.07 years). The range was 30 to 75 years of age. Most (68.4%) were female. Nearly all of the participants identified as white, except 3 who identified as black and 2 identifying as Native American. Just under one-half of the sample (45.8%) was currently married. Most (69.6%) had graduated from high school. About one-third (32.3%) were covered by Medicaid and 38.4% were Medicare beneficiaries.

Bivariate Associations

Table 1 displays the bivariate associations between the dichotomous correlates and the return of FIT kits. As shown, 4 of the 8 correlates obtained significance. Those indicating an annual income of less than $15,000 per year were more likely to return the kits (89.8%) than those earning more than this amount (73.8%). Also, those indicating they did not have a regular health care provider were more likely to return their kits (92.3%) compared with those who indicated having a regular provider (79.9%). Persons rating themselves as overweight or obese were less likely to return kits (76.4%) than those not having this perception of their weight (87.3%). Finally, people who did not graduate from high school were more likely to return their kits (88.6%) than those with at least a high school education (79.2%).

Table 2 displays the bivariate associations between the 2 continuous correlates and the return of FIT kits. As shown, neither age nor the scale measure of CRC fatalism was associated with return of FIT kits.

Multivariate Associations

The multivariate model achieved significance (χ^2 = 191.4, 2 *df*, *P* < .001) and had adequate Goodness of Fit (χ^2 = 1.43, 2 *df*, *P* = .49). The final model included only 2 correlates. Those indicating an annual income of less than $15,000 were 2.85 times more likely to return their kits (95% CI: 1.56–5.24; *P* < .001). Also, those not perceiving themselves to be overweight/obese were 1.95 times more likely to return their kits (95% CI: 1.07–3.55; *P* = .029). Not having a regular health care provider (*P* = .06) and not graduating from high school (*P* = .49) were not retained in the final iteration of the model.

Discussion

These findings suggest that an outreach-based CRC screening program may yield high return rates when people can interface with staff members initially providing the kits to them. This level of personal contact may be important in rural populations. Whether taking this "personal connection" out of the distribution model (such as would be the case if people were expected to return the kits only by US mail) would substantially reduce the return rate is an empirical question worthy of future investigation. Persons who have low incomes and lack a regular health care provider may be particularly likely to return kits, as are those who lack a high school education and consider themselves as not being overweight or obese. In the adjusted analysis, it was further shown that only low income and perceptions of not being overweight/obese were the primary predictors of FIT kit return.

The observed return rate exceeded that found in past studies,[13,14] including studies of FOBT kits.[15–19] One key difference between this study and these past studies is that our participants were recruited through community outreach, as opposed to recruiting clinic patients.

Regarding the finding that people with relatively lower incomes were more likely to return an FIT kit, one possible reason for this may involve the sense of gaining something without financial cost. Indeed, the Structural Model of Health Behavior[1,20] suggests that simply making an innovation such as an FIT kit easily and freely available may be an adequate intervention in its own right.

As for the finding regarding those self-reporting as not being overweight or obese being more likely to return an FIT kit, this phenomenon may be attributable to a concept included in the transactional model of stress and coping.[21] This model suggests that screening behaviors, for example, are predicted by a person's perceived self-efficacy for coping with a potential positive diagnosis (emotional coping) and their perceived self-efficacy for physically coping with a positive diagnosis. To the extent people know that being overweight or obese creates added risk for CRC, it is possible that these individuals may not be emotionally or physically prepared to potentially receive the news that they have a positive result on an FIT test, thus suggesting the need for further evaluation and possible cancer.

Limitations

Our findings are limited by the use of a convenience sample. Furthermore, generalization of the study findings to other underserved, rural populations is not possible. Also, our selection of covariates was limited; clearly, unmeasured confounding may have occurred.

Conclusions

The prevailing strategy for promoting CRC screening is embedded in the medical paradigm of serving patients in clinics. A community-based approach to delivering FIT kits challenges the assumptions underlying current CRC screening methods, and an in-person, community-based screening program may have important implications for isolated populations with limited access to health care. This low-intensity, low-resource service delivery intervention transcends geography and the limitations of rural health care systems. A key challenge will be boosting return rates among those who are not classified as low-income and among those who perceive themselves to be overweight or obese.

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Table 1

Bivariate Associations Between Dichotomous Correlates and Returning the FIT Kit, 8 Rural Kentucky Counties, 2014 (N = 345)

Correlate		Percent Returning Kit	*P*
Personal income is less than $15,000 annually			
No	(n = 168)	73.8	
Yes	(n = 177)	89.8	<.001
Has graduated from high school			
No	(n = 105)	88.6	
Yes	(n = 240)	79.2	.036
Sex			
Male	(n = 108)	84.3	
Female	(n = 236)	80.9	.68
Currently married			
No	(n = 187)	84.5	
Yes	(n = 158)	79.1	.19
Currently smoke			
No	(n = 220)	80.9	
Yes	(n = 119)	84.0	.47
Currently overweight or obese			
No	(n = 166)	87.3	
Yes	(n = 174)	76.4	.009
Has some form of medical insurance			
No	(n = 31)	77.4	
Yes	(n = 309)	82.5	.48
Has a regular health care provider			
No	(n = 65)	92.3	
Yes	(n = 274)	79.9	.019

Table 2

Bivariate Associations Between Continuous Correlates and Returning the FIT Kit, 8 Rural Kentucky Counties, 2014 (N = 345)

Correlate	Mean/Returning Kit	Mean/Not Returning	*t*	*df*	*P*
Age	57.3	56.7	.42	343	.68
Fatalism[a]	9.13	8.43	1.44	332	.15

[a]The overall SD for this scale was 3.4.