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The Effectiveness and Cost to Improve Colorectal Cancer Screening in a Federally Qualified Homeless Clinic in Eastern Kentucky

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Abstract

The objective of this study was to analyze the effectiveness and cost of patient incentives, together with patient navigation and patient reminders, to increase fecal immunochemical test (FIT) kit return rates and colorectal cancer screening uptake in one federally qualified health center (FQHC) in Appalachia. This FQHC is a designated homeless clinic, as 79.7% of its patient population are homeless. We collected process, outcome, and cost data from the FQHC for two time periods: usual care (September 2016–August 2017) and implementation (September 2017–September 2018). We reported the FIT kit return rate, the increase in return rate, and the additional number of individual screens. We also calculated the incremental cost per additional screen. The patient incentive program, with patient navigation and patient reminders, increased the number of FIT kits returned from the usual care period to the implementation period. The return rate increased by 25.9 percentage points (from 21.7% to 47.6%) with an additional 91 people screened at an incremental cost of $134.61 per screen. A patient incentive program, together with the assistance of patient navigators and supplemented with patient reminders, can help improve CRC screening uptake among vulnerable and homeless populations.

Keywords

colorectal cancer; cancer screening; economic evaluation; FQHC; homelessness; evidence-based interventions

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BACKGROUND

Sixty counties in the Appalachia region of Eastern Kentucky are considered hotspots for colorectal cancer (CRC), with higher CRC death rates than nonhotspot areas of the United States (Siegel et al., 2015). Compared to the country as a whole, the multistate Appalachian region tends to have higher poverty rates, lower college education rates, and lower median income (Pollard & Jacobsen, 2019). These factors are all related to low levels of CRC screening (Knight et al., 2015), a key preventive measure in cancer control.

Since 2009, the Centers for Disease Control and Prevention has supported the Colorectal Cancer Control Program (CRCCP). Additional detail on the CRCCP is provided in a companion article in this journal (Tangka et al., 2020). In 2015, the Kentucky Department for Public Health became one of 30 organizations funded by the CRCCP to help local health systems implement evidence-based interventions to increase CRC screening uptake among vulnerable populations.

The Kentucky Department for Public Health partnered with Little Flower Clinic (LFC), a federally qualified health center (FQHC) in the small, Appalachian town of Hazard, Kentucky. LFC provides medical, dental, and behavioral health services to the otherwise underserved population, many of whom may not have jobs or permanent residences. Indeed, LFC is a designated homeless clinic, as 79.7% of its patients report homelessness (e.g., they live in a shelter, in transitional housing, or on the street, or have “doubled-up,” meaning they live with friends or family due to lack of income or because their residences are uninhabitable; Health Resource and Services Administration, 2018). LFC offers transportation services to and from the clinic for all of its patients.

Both the self-administered fecal immunochemical test (FIT) and colonoscopy are used in LFC’s colorectal cancer screening. Because FIT represents the overwhelming majority of the clinic’s CRC screenings, and because colonoscopies require referral to outside facilities, the partners focused on increasing completed FIT kits through implementing supportive, patient-level interventions. The objective of this study was to examine the effectiveness and cost of those interventions—patient incentives, supplemented by patient navigation and patient reminders—in increasing FIT kit return rates.

METHOD

Prior to implementation, LFC providers recommended CRC screenings to its age-eligible population but did not use patient incentives, reminders, or navigation. LFC implemented the three interventions in fall 2017 with patients eligible for and selecting the FIT screening option. Central to the intervention package was the prepaid $10 gift card for Food City, a local supermarket. Patients were told of the incentive when they were given a FIT kit to complete on their own and return to the clinic. The kits were provided to all eligible patients at no cost. Incentives were funded through donations received by LFC. Patients were given the $10 gift card when they returned the completed kit.

The patient support interventions are described in Figure 1. Prior to a scheduled office visit, nurses or patient navigators would identify patients due for CRC screening. During the visit,

the nurse would discuss the appropriate screening options with the patient; FIT kits were offered only to average-risk adults ages 50–74 not up-to-date with screening. If an eligible patient chose the FIT kit, the nurse then explained how to complete and return it.

Patient navigators were responsible for tracking the FIT kits. If a kit was not returned, the navigator followed up biweekly with a phone or mail reminder to complete and return it. These contacts allowed the navigators to assist patients to address relatively simple barriers, such as arranging transportation to the clinic, providing further instructions on using the kit, or replacing kits that had been lost. Patient navigators continued to follow up until the kit was completed and returned or the patient indicated unwillingness to complete the test. If, after 1 year, the navigator received no response and the kit was not returned, the patient was removed from active follow-up. Although beyond the scope of this analysis, the LFC protocol continued the navigator support for patients with positive FIT results, continuing to provide assistance and referrals until the follow-up colonoscopy was completed and results received.

ANALYSIS

To analyze the effectiveness of the interventions in improving FIT kit returns, we collected process, outcome, and cost data from LFC for two time periods: usual care (September 2016–August 2017) and implementation (September 2017–September 2018). All data were collected retrospectively. The process measures included number of FIT kits distributed, number of patient reminders made by phone, and number of patients receiving incentives. The reported outcome measures were the FIT kit return rate, the increase in return rate, and the additional number of individual screens from the usual care to intervention periods. We compared the process and outcome measures between the usual care and implementation periods and report p values to indicate whether the percentage differences were significant for FIT kit returns, positive FITs, and follow-up colonoscopies.

In addition, LFC collected data regarding the time and cost of activities involved in implementing the incentive system and the costs of processing FIT kits (LFC purchases a number of FIT kits and processing materials as a unit), purchasing incentives, and mailing reminders. Using this information, we calculated the incremental cost per additional screen.

RESULTS

We present the process and outcome measures in Table 1 for both the usual care and implementation periods. The number of FIT kits distributed increased between usual care and implementation periods from 184 to 353, and the number of FIT kits returned increased from 40 to 168, a statistically significant increase. In total, during the implementation period, of the 168 FIT kits returned, 121 were returned without a reminder phone call while 47 were returned after the reminder call. The FIT kit return rate increased to 47.6% during the implementation period from 21.7%, a more than double increase. We estimate that an additional 91 patients were screened based on the 353 FIT kits distributed during implementation. The percentage of FIT kits returned that were positive decreased between the two time periods from 12.5% during usual care to 9.5% during implementation. There

was a minor increase in the percentage of follow-up colonoscopies completed during implementation compared to the previous usual care period.

The total cost of the FIT kit patient incentive program, including the patient navigation and patient reminders (reported for the implementation timeframe only), was $11,632.54 (Table 2). The majority of costs were for the patient navigators' activities ($9,163.54), followed by $1,680.00 for the incentives to patients who returned FIT kits, and $727.90 for the processing costs of the kits. Slightly more than $61 was spent on postage for mailing reminders. We estimated that the incremental cost per additional screen was $127.83.

DISCUSSION

LFC's multicomponent program increased the number of FIT kits distributed and returned from the usual care period to the implementation period. The increase in the return rate was 25.9 percentage points, more than double the rate from the usual care period, and added an estimated 91 people screened at an incremental cost of $127.83 per screen. The $10 Food City incentive may have been particularly valuable to LFC patients, as a substantial percentage were without a permanent residence, lived with family or friends, could not live in their homes due to needed repairs, had bills beyond their incomes, or lived on the street. In addition, the ability to redeem the incentive for gasoline might have been particularly relevant since approximately half of the patients had a vehicle.

There were challenges in improving FIT kit return rates, such as kits not being returned to LFC in a timely manner or patients forgetting that they had received FIT kits. Also, despite LFC staff providing education about the importance of screening, patients may have had significant competing priorities. Experiencing homelessness posed difficulties in maintaining contact for follow-up. Comorbidities, such as mental health and substance use issues frequently experienced with homelessness (Wadhera et al., 2019), may also be a barrier to completing CRC screening. In an attempt to overcome these challenges, LFC staff reminded patients to return FIT kits, provided education on the importance of CRC screening, offered demonstrations on how to complete the test, assisted with transportation to the clinic, and provided referrals for addressing more complex challenges.

Although this study focused on the effort to increase FIT kit return rates, it is important to note that broader results indicate that the follow-up rate for colonoscopies after positive FIT tests did not increase substantially between the usual care and implementation periods. According to representatives from LFC, there may be additional barriers facing LFC's patient population related to transportation and lack of privacy for bowel prep prior to the colonoscopy. These barriers should be systematically assessed to identify appropriate interventions to improve the completion rate. The screening continuum is not complete without follow-up colonoscopies for positive FIT tests, and the lack of adequate follow-up is a pervasive problem in CRC screening programs for low-income populations that use FIT (Nadel et al., 2019).

As noted, the incremental cost was approximately $128 per additional screen at LFC. Our previous research in other settings has shown a wide range of incremental costs per

additional CRC screen (Conn et al., 2020; Kim et al., 2020). In rural health centers in West Virginia that were implementing a multicomponent intervention (patient and provider reminders with patient assessment and feedback), we found the average cost per FIT kit returned to be approximately $60 (Conn et al., 2020). In contrast, we calculated the incremental costs of an additional screen in 133 FQHCs in Chicago utilizing primarily a physician reminder intervention to be approximately $145 (Kim et al., 2020). Costs at LFC were driven primarily by the time spent by patient navigators to track and contact patients.

There are a number of limitations within this study. First, the results are based on one rural FQHC, limiting generalizability. Second, we utilized a relatively short implementation period of 13 months. It is possible, as the intervention continues, that the long-term effectiveness of the three selected interventions may change in either direction with changes in community or health care context. Third, the implementation period was 1 month longer than the usual care period, which could have allowed for more FIT kits to be distributed and returned. However, we accounted for this by reporting percentages and rates as opposed to raw numbers. Fourth, we collected cost data from LFC retrospectively. Although we provided guidance to staff on the data collection process, it is possible that the data may be affected by recall bias.

IMPLICATIONS FOR PRACTICE AND/OR POLICY AND RESEARCH

This study demonstrated that modest financial incentives, together with patient navigation and patient reminders, can increase FIT kit return rates among a vulnerable rural, largely homeless population. The incremental cost per person screened was also estimated to be within the parameters found in our previous studies (Conn et al., 2020; Kim et al., 2020). The results supplement recommendations of *The Community Guide*, which recommends multicomponent, evidence-based interventions to promote CRC screening as a key strategy for eliminating disparities in cancer prevention and control (Community Preventive Services Task Force, 2012; Sabatino et al., 2012).

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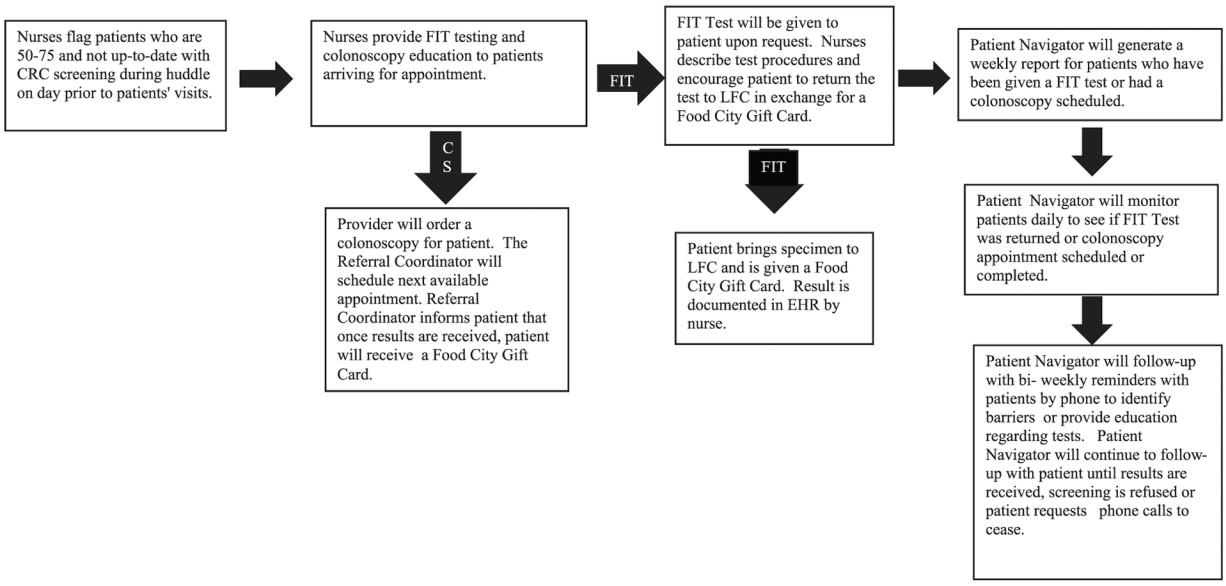

FIGURE 1.

Process Flowchart of LFC's Patient Incentive Program for CRC Screening

Note. CRC = colorectal cancer screening; CS = colonoscopy; FIT = fecal immunochemical test; EHR = electronic health record; LFC = Little Flower Clinic.

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TABLE 1

Process and Outcome Measures of Colorectal Cancer Screening With FIT During Usual Care and Implementation Periods at Little Flower Clinic

Measure	Time period		*p*
	Usual care, September 2016-August 2017	**Implementation, September 2017-September 2018**	
Screening with FIT kits			
Process measures (*n*)			
FIT kits distributed	184	353	
Kits returned without follow-up phone calls	40	121	
Kits returned after follow-up phone calls	n/a	47	
Outcome measures			
FIT kits returned (*n*)	40	168	
FIT kit return rate (%)	21.7 (40/184)	47.6 (168/353)	<.001
Incentives distributed (*n*)	n/a	168	
Increase in return rate (% points)		**+25.9**	
Additional individuals screened (based on 353 kits distributed)[a] (*n*)		**91**	
FIT results,[b] (%)			
Positive FITs	12.5	9.5	.575
Follow-up colonoscopies reported	40.0	43.8	.884

Note. t test was used to calculate *p* values. n/a = not applicable; FIT = fecal immunochemical test.

[a]91 additional screened was calculated as 25.9% of 353 indicated by boldface.

[b]Small sample sizes were suppressed.

TABLE 2

Costs of Colorectal Cancer Screening With FIT at Little Flower Clinic (Implementation Period Only)

Patient navigator costs	$9,163.54
Processing cost of FIT kits[a]	$727.90
Postage for mailing reminders	$61.10
Incentives Payments for returned FIT kits	$1,680.00
Total implementation cost	$11,632.54
No. of additional FIT screens	91
Incremental implementation cost Per additional screen	$127.83

Note. FIT = fecal immunochemical test.

[a]This is the cost of processing 91 additional FIT kits.

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