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A Colorectal Cancer Screening Program in an Underserved, Ethnically Diverse Population in Chicago, IL

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Abstract

Objective—To describe the structure and outcomes of a colorectal cancer screening program at CommunityHealth, the largest free health clinic in Illinois.

Methods—We conducted a retrospective observational study using administrative clinical data from 2006–2011.

Results—A total of 4026 patients were eligible for colorectal cancer screening of which 2418 (60.0%) completed fecal occult blood testing (FOBT). Subsequently, 1657 patients had negative FOBT results and 1365 patients underwent on-site flexible sigmoidoscopy. Over 90% of patients had never had a prior screening examination. A majority of patients were female (61.7%) and self-identified as Mexican (37.5%) or Polish (28.2%). A total of 203 biopsies were performed resulting in the detection of 69 adenomas (5.0%) and 1 adenocarcinoma (0.1%).

Conclusions—A comprehensive colorectal cancer screening program was successfully implemented in a large community health center serving a population of diverse racial and ethnic backgrounds without prior access to screening. This program could serve as model for colorectal cancer screening in diverse, low resource communities.

Keywords

colorectal cancer; screening; community health; public health

INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer-related mortality in the United States (US) [1]. However, with the advent of screening modalities, death from CRC is largely considered a preventable occurrence. Several studies have shown that CRC

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screening decreases the incidence of CRC and improves overall mortality [2–6]. The US Preventive Service Task Force currently recommends a number of strategies to screen for CRC: high sensitivity fecal occult blood testing (FOBT) and fecal immunochemical test (FIT) testing annually, high sensitivity FOBT every three years with flexible sigmoidoscopy every five years, or colonoscopy every 10 years [7]. The application of these screening modalities in clinical settings has been inconsistent, with national surveys in the United States indicating that only up to 55% of eligible patients are screened, and smaller studies reporting screening rates as low as 27% in select minority or low socio-economic status populations [8, 9].

The causes of poor screening compliance are complex and multi-factorial, likely related to a combination of clinician and counseling practices, patient perceptions, access to care, and financial considerations. Patients at greatest risk of not being screened include racial minorities [10], patients with Medicaid or no insurance coverage [11], foreign born patients [12], and those with lower socioeconomic status [13]. Language and cultural barriers are also likely to contribute to the disparities in screening due to diminished communication quality, particularly without adequate interpretative services [14]. Even when a language barrier does not exist, Gao *et al.* noted that discordant physician-patient communication and lack of acknowledgement of cultural barriers are associated with a lower likelihood of CRC screening [15].

Colorectal cancer screening in low resource settings with ethnically and racially diverse populations should focus on strategies that maximize the number of patients screened. Our institution partnered with a free community health center to implement a colorectal cancer screening program in 2006. The objectives of this study were to describe the structure of this comprehensive colon cancer screening program in an underserved, ethnically diverse community and determine flexible sigmoidoscopy outcomes 6 years after program initiation.

METHODS

Study Site

CommunityHealth (Chicago, IL) is the largest volunteer-based free clinic in Illinois serving approximately 9000 patients annually. The clinic serves a predominantly Mexican/Hispanic and Eastern European community (52% and 18% of the patient population, respectively). Patients eligible for care must have no other insurance with the exception of Medicare Part A and their income cannot be greater than 250% of the federal poverty level. CommunityHealth must be the patient's primary care provider and patients must not be eligible for other government sponsored health care programs.

Screening protocol

In 2006, Northwestern University implemented a colorectal cancer screening program at CommunityHealth in Chicago, IL. The screening protocol is shown in Figure 1. Currently, all age appropriate (average risk patients >50) patients are offered colorectal cancer screening. Patients with a significant family history of colon cancer, history of prior abnormal screening, or colon cancer are referred to an outside facility for colonoscopy (Rush University or Northwestern University, Chicago IL). Data regarding colonoscopy follow-up and results were not available at the time of this study from CommunityHealth or the partnering institutions. Remaining patients are offered fecal occult blood testing (FOBT). Patients with positive FOBT results are referred for colonoscopy and patients with negative FOBT are offered flexible sigmoidoscopy performed on-site at CommunityHealth by volunteer physicians (Northwestern University gastroenterology fellows with attending oversight). For non-English speaking patients, instructions for bowel preparation are

provided via interpreters and translated patient materials. English speaking patients are also provided standard verbal and written instructions. Patients are called prior to appointments with reminders in their preferred language. The bowel preparation consists of a clear liquid diet the day before the exam and 2 tap water enemas before coming to clinic.

Facilities and personnel

There are a total of 4 flexible sigmoidoscopes (Olympus, Center Valley, PA) with optical eyepieces and biopsy capability available for procedures. All flexible sigmoidoscopy procedures are performed without sedation and with the assistance of a single CommunityHealth medical assistant or registered nurse. Four clinic rooms were allocated for endoscopy and the clinic was conducted one half day per week. Approximately 10 patients were scheduled per week and a single fellow and nurse conducted all of the sigmoidoscopies. The endoscopy nurse conducted cleaning of the flexible sigmoidoscopes in between exams.

Study design

We conducted a retrospective observational study using data from the CommunityHealth clinical database from 2006–2011. We obtained approval from the CommunityHealth board of directors to obtain de-identified patient data from its clinical patient database, which is maintained by staff at CommunityHealth.

Our institutional IRB reviewed the protocol and determined that the data elements were collected for routine clinical care at CommunityHealth and that an IRB review was not necessary to conduct the study (via the definition of Human Subjects Research 45 CFR. 46.102).

Inclusion criteria

Patients who completed the CommunityHealth colorectal cancer screening protocol from 2006 to 2011 were eligible for the study.

The study sample consists of the entire available study population from CommunityHealth and exclusion criteria were not applied. Eligibility criteria for cancer screening included 1) Age >50 with no personal or family history of colon cancer 2) No personal history of adenomatous polyps 3) Stools negative for blood in the past year 4) No symptoms (abdominal pain, weight loss, bleeding, etc.) and 5) No history of inflammatory bowel disease or unexplained anemia.

Measures and Outcomes

Descriptive measures included screening adherence and demographic characteristics (age, sex, self-identified race/ethnicity). Outcomes included procedural (biopsy rate, extent of exam, and bowel preparation quality) and clinical characteristics (polyp/adenoma detection rate and follow up recommendations).

Statistical Analyses

Descriptive statistics were calculated for each outcome measure independently. Means and medians were reported for continuous variables. The polyp detection rate and adenoma detection rate were reported as an overall proportion of the entire screened patient sample. All analyses were performed using SAS version 9.3 (Cary, NC).

RESULTS

The screened population at CommunityHealth is shown in Figure 1. A total of 4026 patients were eligible for colorectal cancer screening from 2006–2011 of which 2418 unique patients (60.0%) completed fecal occult blood testing (FOBT). A total of 501 (20.7%) patients had 1 or more FOBT test results but the majority of patients had their most recent FOBT within 3 years of the study time frame (N=1565, 74.5%). Subsequently, 1657 patients had negative FOBT results and 1365 of these patients underwent flexible sigmoidoscopy (63.2% of patients with negative FOBT and 33.9% of the total population eligible for screening). A total of 241 patients had positive FOBT results and were referred for colonoscopy; 520 patients (12.9% of the total population) did not complete FOBT testing.

Demographics of patients who underwent flexible sigmoidoscopy are shown in Table 1. The majority of patients were female with a median age of 57.4 yrs. (53.5–61.6, 25th–75th %). The largest proportion of patients self-identified as of Mexican and Polish heritage (37.5% and 28.2%, respectively), but patients self-identified with numerous other races, ethnicities, and regions (footnotes for Table 1). The majority of patients had not previously undergone colon cancer screening. Only 87 patients had a prior flexible sigmoidoscopy (6.4%), 79 patients had a prior barium enema (5.8%), and 111 had a prior colonoscopy (8.2%). There were 5 patients with missing data regarding prior screening procedures.

The documented quality of bowel preparations for flexible sigmoidoscopy was “good” or “excellent” in the majority of patients (N=838, 69.5%). A “fair” preparation was noted in 229 patients (16.9%). A “poor” or “inadequate” preparation was documented in 157 patients (13.3%). The median extent of colon length examined was 60cm (range 50–70cm). A total of 203 biopsies were performed in 1365 procedures. There were no major complications or adverse events reported during or immediately after the flexible sigmoidoscopy procedures.

Of the 203 tissue biopsies, the median polyp size identified was 4.0 mm (Table 2). A total of 109 biopsies showed benign or normal histology. Adenomatous tissue was detected in 69 biopsies, reflecting an adenoma detection rate of 5.1% for the screened population. Hyperplastic tissue was identified in 65 (4.8%) of biopsies. One adenocarcinoma was identified. Remaining biopsies were considered benign and included normal and inflammatory tissue.

Documented recommendations at completion of flexible sigmoidoscopy at CommunityHealth are shown in Table 3. The majority of patients (N=1055, 77.5%) were given recommendations to repeat flexible sigmoidoscopy for screening (Table 3). Other recommendations included repeating flexible sigmoidoscopy with full colonoscopy prep or to have a colonoscopy. The most common screening time interval recommendation was 5 years (N=970, 71.3%). A minority of patients were told to repeat screening at their next available convenience (N=247, 18.2%), usually due to inadequate preparation.

DISCUSSION

This study describes the successful implementation of a comprehensive colorectal cancer screening program in a low resource setting serving uninsured patients of diverse ethnic and racial backgrounds. The screening program successfully incorporates FOBT and subsequent flexible sigmoidoscopy in an outpatient setting performed by volunteer physicians. The participation rate was 60.0% for FOBT and 68.5% of patients with negative FOBT had a subsequent flexible sigmoidoscopy procedure. Most patients had never been exposed to a prior colorectal cancer screening procedure. The majority of patients who underwent flexible sigmoidoscopy had an adequate bowel preparation and complete exam. This is also reflected by the fact that the vast majority of patients were given recommendations for the

standard 5 year screening intervals after flexible sigmoidoscopy as recommended by guidelines [7] for colon cancer screening with flexible sigmoidoscopy. Adenoma detection rates, based on biopsy samples, were 5.1% over the 6 year period. A total of one adenocarcinoma was detected during the study period.

Approaches have varied to increase colorectal cancer screening in the US among uninsured minority patients. In 2008, the CDC implemented a 3 year demonstration program to explore the feasibility of a national colorectal cancer screening program for the uninsured across 5 states [16]. A similar program was implemented in Rhode Island [17]. The clinical outcomes of these two programs have yet to be reported. Miesfeldt *et al.* implemented a screening program in Maine for uninsured women [18]. A total of 300 women were mailed an offer for no-cost FOBT and 98 women requested the kits (31.0%). A total of 52 FOBT (53.0%) kits were ultimately returned. A partnership in Alaska between a fund-raising organization (Ride for Life Alaska) and the Anchorage Neighborhood Health Center implemented a local CRC screening program for low income patients [19]. Primary screening consisted of immunochemical FOBT (iFOBT) testing and referral to colonoscopy for positive results. In 2007, 549 iFOBT kits were provided and 396 were returned (72%). Of the returned kits, 24% had positive results but only 7 patients had follow up colonoscopies [19]. The participation rates for FOBT testing in our study were similar to those in Alaska. Participation in endoscopic screening in our study is higher most likely because flexible sigmoidoscopy is performed on site at the local community health center.

Flexible sigmoidoscopy is the only endoscopic screening modality with evidence from multiple randomized controlled trials showing a decrease in the incidence and mortality of colorectal cancer [2–6]. Screening with flexible sigmoidoscopy was shown to reduce death from distal colorectal cancers by 50% in the most recent report from the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial [6]. Reduction in mortality and incidence is predicated upon adequate identification and removal of adenomatous tissue and polyps. In the UK Flexible Sigmoidoscopy Screening Trial, the total distal adenoma detection rate for flexible sigmoidoscopy was 12.1% for all patients (without initial FOBT testing) [2]. A similar rate (10.8%) was reported in the similarly designed SCORE trial from Italy [5]. Hol *et al.* reported an adenoma detection rate of 8.0% in a Dutch population [20] comparing flexible sigmoidoscopy with stool based testing in which patients did not have FOBT testing prior to the sigmoidoscopy procedure. Our adenoma detection rate represents a patient population with initial negative fecal occult blood testing. We would expect some decrease compared to these prior studies, however, our results do reflect real world clinical practice as they were not part of a clinical trial.

The majority of research evaluating differences and disparities in CRC screening have focused on the traditional racial and ethnic groupings of Black/African Americans, Hispanic/Latino, and Whites/Caucasian [10, 21, 22]. The program implemented at CommunityHealth is unique in the breadth and diversity of racial and ethnic groups that are represented. More than 30 self-identified racial, ethnic, and regional groups were represented in the screened population. The quality of the bowel preparation and ability to tolerate the exam was sufficient in the majority of patients, most of whom had never experienced a screening procedure. These results are likely due to the interpretive support and patient navigation services provided by the CommunityHealth staff.

Our study has several limitations. The program at CommunityHealth was not originally started for research purposes, thus the clinical database used in this study was administrative and data were only available from those patients who completed the screening program. Other information on comorbid conditions was not available. However, despite the fact the data were collected for administrative purposes, there were very little missing data. Race and

ethnicity is self-reported by the patient when they enroll at CommunityHealth, thus there is some redundancy and overlap between regions and ethnic group categories. Although the majority of patients had adequate bowel preparation, our results are less than what has been reported in other studies with flexible sigmoidoscopy [8]. The reasons for this are not known and reflect areas for potential quality improvement that are being addressed at CommunityHealth. As this was a retrospective descriptive analysis we also did not have the ability to determine why some patients did not complete FOBT testing (12.9%) or flexible sigmoidoscopy (~18%). The academic partnership and commitment is a key feature of this program and may not be generalizable to all communities, although most urban and academic hospitals in the US would theoretically be capable of supporting this infrastructure.

In summary, we have described a sustainable comprehensive colorectal cancer screening with FOBT and flexible sigmoidoscopy in an underserved population in Chicago, IL. Endoscopic screening programs should be of consistent quality, with adequate bowel preparation, high procedure completion rates, and adequate polyp or adenoma detection rates [23–25]. Participation rates were substantial in our population, which represented a diverse range of backgrounds. Adenoma detection rates were also comparable to previously published results using flexible sigmoidoscopy [20]. The CommunityHealth colorectal cancer-screening program could serve as model for screening in diverse, low resource communities. The protocol parallels guidelines for population based colorectal cancer screening using a modality with the greatest amount of evidence from randomized controlled trials to support its use. As healthcare stakeholders (patients, clinicians, and payers) reevaluate the effectiveness and cost/benefit ratio of screening strategies,[26] this type of system may be attractive regardless of socioeconomic status.

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Abbreviations

FOBT	Fecal occult blood testing
CRC	colorectal cancer
FIT	fecal immunochemical test

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Figure 1.
Screened population at CommunityHealth (2006–2011)

Table 1

Demographic characteristics of patients with flexible sigmoidoscopy

	N (Total=1365)	%
Median Age (IQR)	57.4 (53.5–61.6)	
Gender¹		
Female	841	61.7%
Self-Identified Race/Ethnicity/Country		
Mexican	510	37.5%
Polish	384	28.2%
Puerto Rican	82	6.0%
Guatemalan	51	3.8%
Ecuadorian	45	3.3%
African American	35	2.6%
Other (less than <2%) ²	154	11.3%
Unknown/Missing	104	7.7%

¹ 1 record with unreported sex

² Cuban, Indian, Irish, Lithuanian, Central American, Ukrainian, Asian, Latvian, Peruvian, Chinese, Honduran, Italian, el Salvadoria, Filipino, Belizean, Chilean, Nicaraguan, Bolivian, Venezuelan, Korean, Iraqi, Costa Rican, Romanian, Argentinian, Japanese, Dominican, Uruguayan, Moroccan, Pakistani, Bulgarian, Serbian, Sudanese, Panamanian

Table 2

Polyp size and histology (203 biopsies)

	N	% of Total (N=1365)
Polyp Size, mm (median, range)	4.0 (1.0–25.0)	
Histology findings		
Adenoma	69	5.1%
Hyperplastic	65	4.8%
Normal	32	2.3%
Adenocarcinoma	1	0.1%
Colitis	4	0.2%
Inflammatory polyp	1	0.01%

Table 3

Recommendations at time of flexible sigmoidoscopy

Recommendation	N	%
Next follow up test recommended after sigmoidoscopy procedure¹		
Flexible Sigmoidoscopy	1055	77.6%
Flex Sig w/ Colonoscopy prep	141	10.4%
Colonoscopy	143	10.5%
Pending pathology	20	1.5%
Follow up interval recommended after sigmoidoscopy procedure²		
10 yrs	4	0.3%
5 yrs	970	71.3%
3 yrs	94	6.9%
2 yrs	2	0.2%
1 yr	23	1.7%
Next available appointment	247	18.2%
Pending pathology results	20	1.5%

¹ 6 records with missing data² 5 records with missing data