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Clinic Exploration of Care Processes to Promote Colorectal Cancer Screening in Rural Accountable Care Organization Clinics: A Qualitative Case Study

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Abstract

It is essential to have an effective care process to promote colorectal cancer (CRC) screening particularly in rural areas. Primary care health care providers may have a significant impact on improving CRC screening rates among rural residents through systematic screening processes in their clinics. In this qualitative study, we aimed to explore the whole clinic processes of recommending and referring CRC screening in the rural accountable care organization (ACO) primary care clinics. We collected qualitative data through 21 semi-structured in-depth interviews with healthcare providers in rural primary care ACO clinics in Nebraska. We audio recorded and transcribed the interviews and analyzed the data using an inductive content analysis approach. The qualitative analyses revealed that ACO clinics are promoting CRC screening through teamwork with enhanced utilization of electronic health records and various other reminder strategies for both providers and patients. Areas for improvement in ACO clinic processes were also identified.

Keywords

Colorectal Cancer Screening, Qualitative Research, Rural Health, Primary Care, Accountable Care Organization, Team-Based Care

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Clinic Exploration of Care Processes to Promote Colorectal Cancer Screening in Rural Accountable Care Organization Clinics: A Qualitative Case Study

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It is essential to have an effective care process to promote colorectal cancer (CRC) screening particularly in rural areas. Primary care health care providers may have a significant impact on improving CRC screening rates among rural residents through systematic screening processes in their clinics. In this qualitative study, we aimed to explore the whole clinic processes of recommending and referring CRC screening in the rural accountable care organization (ACO) primary care clinics. We collected qualitative data through 21 semi-structured in-depth interviews with healthcare providers in rural primary care ACO clinics in Nebraska. We audio recorded and transcribed the interviews and analyzed the data using an inductive content analysis approach. The qualitative analyses revealed that ACO clinics are promoting CRC screening through teamwork with enhanced utilization of electronic health records and various other reminder strategies for both providers and patients. Areas for improvement in ACO clinic processes were also identified. Keywords: Colorectal Cancer Screening, Qualitative Research, Rural Health, Primary Care, Accountable Care Organization, Team-Based Care

Despite the growing evidence of the benefit of colorectal cancer (CRC) screening to reduce incidence and mortality rate of CRC, CRC screening rate in the United States is still not optimal (American Cancer Society, 2015). According to a recent report from the Center for Disease Control and Prevention (CDC), about one-third of Americans aged 50 to 75 years have not been screened for CRC as recommended by the United States Preventive Services Task Force (Whitlock, Lin, Liles, Beil, & Fu, 2008). Rural residents encounter additional barriers in CRC screening compared with their urban counterparts due to geographic isolation or lack of education opportunities (Cole, Jackson, & Doescher, 2012; Fan, Mohile, Zhang, Fiscella, & Noyes, 2012; Hughes, Watanabe-Galloway, Schnell, & Soliman, 2015; Ojinnaka, Choi, Kum, & Bolin, 2015). The role of health care providers can be critical in increasing CRC screening

as physician recommendation is found as a major predictor of CRC screening adherence among rural residents (Atassi, Nemeth, Edlund, Mueller, & Tessaro, 2012; Coughlin et al., 2006; Coughlin & Thompson, 2005; Jillcott Pitts et al., 2013).

To respond to the needs of improving CRC screening, the National Colorectal Cancer Roundtable has recently announced an initiative to increase CRC screening rates in the United States to 80% by 2018, which would result in a total of 203,000 averted CRC deaths from 2013 through 2030 (Meester et al., 2015). The CDC report highlighted that more people may be screened if their clinics or health care providers have a systematic screening protocol (or process). The protocol includes identifying people who are not up-to-date, sending out reminders to persons' homes or community settings, communicating with them of each test, and carefully monitoring adherence or follow-up of abnormal tests (CDC, 2013). American Cancer Society introduced the four essential elements for improved CRC screening rates in primary care practices: physician recommendation, a clinic policy, a clinic reminder system, and an effective communication system between providers and patients (Sarfaty, 2008). Three out of the four elements are related to a well-organized clinical protocol for CRC screening. Therefore, establishing an effective care process for recommending or referring CRC screening is critical.

Previous studies used "process mapping" approaches in healthcare to improve patients' health outcomes and care experiences, by analyzing patient care process, identifying wastes in the care processes, establishing meaningful measures of quality, and developing effective interventions (Daly et al., 2006; Trebble, Hansi, Hydes, Smith, & Baker, 2010; Yabroff, Washington, Leader, Neilson, & Mandelblatt, 2003; Zapka, Taplin, Solberg, & Manos, 2003). Several studies analyzed the process of care to examine factors associated with cancer screening in reducing patients' waiting time (Chand, Moskowitz, Norris, Shade, & Willis, 2009) and in the follow-up of abnormal screening tests (Zapka, Taplin, Price, Cranos, & Yabroff, 2010).

Although previous studies provided insights on the importance of understanding the care process to successfully implement CRC screenings, these studies have been primarily focused on the "follow-up process" or "waiting time." Very few studies have examined the entire processes of CRC screening recommendation and referral from the pre-visit moment of care to post-visit follow-ups. Also, the study setting was limited to mostly urban areas (Price, Zapka, Edwards, & Taplin, 2010), which leaves us with a question if these strategies apply to rural primary care settings. Furthermore, the studies that examined one part of the care process (e.g., follow-up) in cancer screening have used mainly quantitative research designs (Price et al., 2010). However, past studies conducted on colorectal cancer screening through qualitative research demonstrated the provision of rich information that informed the current body of knowledge identifying facilitators of CRC screening participation such as awareness of appropriate CRC screening and its purpose, positive attitudes towards CRC screening tests, the motivation for screening (Honein-AbouHaidar et al., 2016). These studies also determined different patient barriers to CRC screening participation including lack of awareness, negative views of cancer, negative attitudes towards CRC screening modalities, lack of motivation for screening, cultural and gender barriers, and socioeconomic barriers (Honein-AbouHaidar et al., 2016).

Given the limited evidence on how the entire CRC recommendation process occur in rural primary care taking into consideration the clinic resources and personnel, as well as the lack of qualitative research studies that explored in-depth the steps of clinic care process, the present study aimed to explore the whole clinic processes of recommending and scheduling CRC screening (mainly focusing on colonoscopy) in the context of the newly emerged health care delivery model, "Accountable Care Organization" (ACO) in a rural Midwestern state.

Author Context

One of the essential components of qualitative research is to establish research in the context of the researchers who conducted the study. All six authors of this study are in an academic context and have experiences in teaching health services research and/or qualitative research methods, as well as conducting research in these areas. The first author (SB)'s area of research focus has been colorectal cancer and health disparities and has conducted several qualitative research projects including colorectal cancer, community violence, hospital emergency preparedness, and local health departments' readiness for accreditation. SB participated in study design, data collection and analysis, and taking the lead of developing this manuscript. The second author (JK) has expertise in organizational management and behavior and has applied her knowledge in organizational and behavioral theories to understand healthcare organizational contexts to promote colorectal cancer screenings in rural Nebraska. JK participated in study design, data collection and analysis, and drafting and critically reviewing the manuscript. The third author (HW) has conducted research focusing on examining the multi-level factors impacting cancer screening rates and the effects of clinic-level factors on reducing risks for cancer, diabetes, and cardiovascular diseases. HW participated in study design and critically reviewed and revised the manuscript. The fourth author (LY) has rich experiences in research related to rural healthcare setting as her area of research has been on team-based system and data sharing network in rural healthcare settings and how they facilitate self-management of populations with chronic conditions including cancer. LY contributed to the initial study design, interpretation of the results, and critically reviewed the paper. The fifth author (DS) is a qualitative research expert specialized in various topics including colorectal cancer, organizational readiness, intimate partner violence, and sexual abuse. DS contributed to the study mainly for designing and developing qualitative data collection and analysis, and critically reviewed the manuscript. The last author (LC) conducted research on cancer, rural health systems and policy, and health care utilization. LC participated in the initial plan of the study design, mentored the overall study operation, and critically reviewed the results and the manuscript. With expertise in both content and methodology, all the authors made significant contribution to the research project. None of the authors had experience as a cancer patient or provider.

Methods

Study design

It is appropriate to use qualitative research when there is a need to explore the issue and obtain a complex, detailed understanding of the issue (Creswell, 2013). With the main objective of the study to explore the entire process for CRC screening recommendation of the new emerging healthcare model from the beginning to end involving different team dynamics and clinic resources, we found the qualitative research to be the best approach in achieving the research objective.

Content analysis is a qualitative approach that systematically codes and analyzes the qualitative data to explore explicit and covert meaning in the text (Bernard & Ryan, 2010). It is also used to explore the patterns and trends of communication in the textual data (Grbich, 2007). As the present study focused on gaining insights into specific steps and finding common patterns (e.g., team dynamics and use of clinic resources) in clinic processes in the context of CRC screening recommendation and referral, the qualitative content analysis appears to be the most appropriate methodology.

Study population and recruitment

The study setting is a physician-led ACO located in Nebraska, a Midwestern state in the USA and consists of fifteen group-practice primary care clinics participating in the Medicare Shared Savings Program (MSSP). These clinics are located in rural counties based on classification by the U.S. Department of Agriculture Economic Research Service (United States Department of Agriculture Economic Research Service, 2013). These clinics serve more than 21,000 Medicare patients who are rural residents. The size of the clinics ranges from 4 to 12 primary care providers (PCPs). All of the participating clinics either have received or are working on completing a patient-centered medical home (PCMH) certification at the time of the study.

The population studied was health care providers at participating ACO clinics. To recruit individual participants, we applied the convenient sampling approach with a referral strategy (Creswell, 2013). Inclusion criteria for the study participants were a minimum of one-year employment with the ACO primary care clinics and direct or indirect involvement with CRC screening process. Specifically, the study recruited PCPs (physician, nurse practitioner, or physician assistant), nurse coordinators/directors, and IT/administrative staff.

The study was funded by the Fred and Pamela Buffett Cancer Center and College of Public Health at the University of Nebraska Medical Center as a Cancer Control and Prevention Pilot Grant. We obtained research approval from the Institutional Review Board of the University of Nebraska Medical Center (#352-15-EP). We collaborated closely with the ACO leadership team to recruit participants. After obtaining the list of potential participants, we sent out invitation letters via e-mails, with a cover letter describing research goals, procedures and confidentiality attached. We also made follow-up phone calls to confirm the receipts of the invitation emails. The final sample size was 21 participants that included PCPs (n=10), nurse care coordinators/director (n=9), and IT specialist/office manager (n=2). Work experience of study participants ranged from a minimum of one year to a maximum of 40 years with the average 30 years. Table 1 provides the description of the participant and clinic characteristics.

Table 1. Participant and Clinic Characteristics (n=21)

Characteristic	Frequency n (%)
Gender	
Female	12 (57)
Male	9 (43)
Job title	
Primary care provider	10 (48)
Nurse coordinator/director	9 (43)
IT specialist/office manager	2 (10)
Location †	
Rural (>20 000 population)	9 (43)
Rural (2500-19 999 population)	10 (48)
Completely rural (2500 population)	2 (10)
Years in practice (median (range))	16 (1-40)
CRC screening rate‡ (median % (range))	71.2 (65.7-79.2)

† The study used 2013 Rural-Urban Continuum Codes based on US Office of Management and Budget delineation as of February 2013 to define non-metropolitan counties (e.g., counties with more than 20 000 population, counties with between 2500 and 19 999 population, and counties with completely rural or less than 2500 population).

‡ Colorectal cancer screening rate is based on the clinic's annual data for 2015 Medicare beneficiaries who had a colonoscopy every 10 years, flexible sigmoidoscopy every 5 years, a fecal occult blood test every year

Data collection and data analysis

We collected qualitative data through semi-structured in-depth interviews. Two researchers (first and second authors) conducted a total of 21 interviews from June through November of 2015. The research team developed the interview guide and modified it throughout the interview process. The research team conducted the interviews in person or by phone based on the interviewees' availability and resources. Each interview took about an hour. Two of the study authors (first and second authors) audio recorded, transcribed, and independently coded the interview transcripts.

We applied the principles of inductive content analysis to analyze the qualitative data using the software NVivo Version 10 (QSR International, 2012). There is no prior research that examined step-by-step clinic process related to CRC screening in ACO clinics. We selected inductive content analysis as this approach is appropriate when there is limited or fragmented prior knowledge on the topic (Elo & Kyngas, 2008). We implemented six steps in using inductive content analysis approach including selecting a unit of analysis, open coding, formulating the preliminary codes out of data, data coding, revising codes and developing categories/themes (Cho & Lee, 2014): (1) Two primary authors (SB and JK) started by selecting a unit of analysis which included whole interview transcripts and extracted texts from interview transcripts to identify steps in the clinic process related to CRC screening. (2) We selected two initial transcripts and used open coding by reading each transcript word by word independently. Open coding is the initial step of theoretical analysis where categories and their properties are discovered (Glaser, 1992). We incorporated open coding as it allowed us to compare one activity to another in the clinic process, find similarities and differences in the care process of ACO clinics and conceptually group them into categories. (3) Next, we met and determined the preliminary codes that emerged from the texts of two initial interview transcripts and in the event of disagreement, we discussed the codes until we reached an agreement. (4) After that, we applied the codes to the remaining transcripts and (5) when data did not fit the existing codes, we added new codes. (6) In the final step, we grouped all the similar codes in the transcripts and categorized them. We discussed and created the broader categories first where clinic care process was organized into three categories (before visit, during the visit, and after the visit). Then we identified themes within each of the three categories with a total of final 16 themes under three categories.

Results

In this qualitative case study, we explored the clinic's care processes related to CRC screening at rural primary ACO clinics in a Midwestern state. We categorized the clinic processes on CRC screening into three groups that reflect three phases of clinic care process: before, during, and after a patient's visit. For each of the three phases, we focused on finding (1) main actors in this phase and their primary roles, (2) main processes related to CRC screening recommendation & referral, and (3) communication tools that are primarily used in this phase.

Pre-visit activities

Clinics reported that nurses, nurse coordinators, and front desk personnel are the main actors of the pre-visit process. Nurses are heavily involved in pre-visit activities of CRC screening recommendation, such as reviewing patient charts, filling out incomplete patient information, inputting memo in the EMR system or mark on the paper charts, while front desk personnel were involved in patient chart review activity. Clinics identified several tools

primarily used in the pre-visit phase including EMR, paper charts, stickers, and written notes, letters, as well as educational handouts. Three themes emerged related to clinic processes on CRC screening in the pre-visit phase: patient identification, patient information verification, and patient reminders.

Patient identification. Participants reported that identifying patients that are due for CRC screening as the first step. Most participants described this step as reviewing charts, as they called “pre-planning” using paper or electronic medical records (EMR) of patients who have upcoming appointments. One of the clinic participants described this step as follows: *“EHR has a health maintenance table. We do pre-planning every day, so the nurse that is looking at the patient list for the day, goes through the patient charts and they see if they are needing a colorectal screening of any kind, or follow up or whatever.”* As illustrated by this quote, most of other participants illustrated similar steps for their patient identification process. Nurses do the pre-planning daily by reviewing patient charts and this activity helps clinics to identify the patients that are due for CRC screening based on their previous medical history.

Verifying patient information. Participants also reported additional steps in their actions associated with the second step in case they found incomplete information of a patient’s previous CRC screening during chart reviews. For example, colonoscopy is one of the CRC screening methods and is recommended for every 10 years. If clinics do not have updated patient records, nurses or clinic staff would make a call to patients to collect the information or call facilities where patients had CRC screening to **verify the information**. One nurse stated, *“If the patient says they’ve had it somewhere else, then we will call and try to get those results put into our system.”* Nurses (nurse coordinators) or front desk personnel in most clinics engage in the conversations to update the patient information, which was noted to be helpful in identifying the patients for their CRC screening in a timely manner.

Patient reminders. One of the highlights of the pre-visit phase steps is a **patient reminder** on CRC screening from the clinics. This included sending out information packet and educational materials on CRC screening for those who turn age 50. This quote illustrates this, *“I would say that with electronic records, I run a report when people turn fifty, and then so we, you know find out all the people who are going to be turning fifty, so we will do that at the end of the year. And then we will send out letters to all those people telling them that when they turn fifty you know, here are some tests that are recommended for them and we include colorectal screening in that letter. And encourage them to come in and see the doctor and so we do that for age fifty.”* Clinics take this step at the end of the year and it helped to ensure patients to be informed on CRC screening prior to their annual wellness visits through mailed letters.

During-visit activities

PCPs play a central role in during-visit clinic process as they are involved in a range of activities, from discussing CRC screening with patients to registering patients’ decision. Additionally, nurses, nurse coordinators, and front desk personnel also play an active role in handing out educational materials, initiating a conversation on CRC screening with patients, or reminding PCPs. Clinics reported using EHR, sticker and written notes, pamphlets and handouts to facilitate their activities on CRC screening recommendation during the patient visit. Seven themes emerged on clinic processes on CRC screening in the during-visit phase: initiating brief conversation, addressing incomplete patient information, reminding PCPs,

providing educational materials to patients, patient-PCP conversation, recording patient's decision and scheduling patient appointments.

Initiating a brief conversation. The during-visit process starts when patients arrive at the clinic for their appointments. Study participants reported that the personnel at the frontline desk initiate a brief conversation with the patients about CRC screening and other screenings they are due at their check-in to prepare them for the conversation with their physicians. One interviewee outlined this step in the following way: *“Well, when the patient comes in the office, we have electronic health records with our software, it will pop up that the patient is due for colonoscopy or whatever other screenings that are necessary at that time, so that prompts us as soon as our medical assistants take them in the back office, that prompts us ask them [you know] ‘are you due for colonoscopy, have you ever thought about that, it is something that the doctor will talk to about,’ so we get the conversation initiated, and then the doctor will come in and go through the guidelines and suggest these guidelines for.”* By discussing informally about the CRC screening before the appointment, nurses ensured to prepare patients for the upcoming discussion on CRC screening with their PCPs. They noted this was helpful to encourage patients when CRC screening was discussed and recommended by multiple healthcare providers at the clinic.

Addressing patient incomplete information. Participants also noted that the frontline desk personnel would take an opportunity to address incomplete patient information on CRC screening during their initial conversation with the patients before the appointment, by one participant articulating, *“So a lot of times what happens is I'm seeing them for their wellness visit, you know, after we've seen them a few times, and say, ‘Hey, it looks like you haven't had a colonoscopy.’ And they say, ‘Oh, well, I had my colonoscopy four years ago,’ and then you're tracking down who did it and where, but then once you get that, then you put it in the chart and they're up to date. And that's what we find most of the time.”* For those patients that clinics were not able to reach and update the information prior to the clinic visit, the information is requested during their annual wellness visit. This way the clinics ensured to keep the patient records up-to-date that would facilitate timely identification of the CRC screening due for patients.

Reminding PCPs. The interviewees reported that nurses or nurse coordinators remind PCPs to discuss CRC screening with the patient while patients wait for their appointments. The types of reminder strategies used by each clinic varied and included using electronic reminders through their EMR system, written memos, sticky notes on patient charts, often called “superbill,” notes on the door of the patient room, or a brief conversation between a nurse and a PCP. A participant from one clinic described their reminder strategy by saying, *“Generally it's the doctor that brings it up initially, but we'll put a note on the door, ‘Needs colonoscopy.’ Maybe there 58-years-old they've never had one. They'll put a sticky note as a reminder to the doctor.”* Another participant described their clinic's strategy: *“And we try to communicate that with the doctor before they go in the room, but we don't always have an opportunity to do that if the doctor's in the room with another patient and he comes out and goes in that room before we do and we're in another room with a patient. Sometimes I think some of the nurses we can send a message when we send the doctor that chart that says, you know patient refuses colonoscopy. That kinda gives a heads up to the doctor that maybe I need to talk to them more in depth.”* By reminding PCPs about CRC screening right before the appointment facilitated the CRC screening recommendation as providers described this strategy being beneficial for them to initiate the discussion and recommend CRC screening to their patients. Additionally,

most of the interview participants emphasized that these reminder strategies save substantial PCP's time from retrieving patient information during the appointment with the patient.

Providing patient educational materials. The interviewees also noted that educational materials on CRC screening can be provided to patients during their appointments. Responses varied among clinics, as some clinics stated that the frontline desk staff or nurses offer educational materials, while in some other clinics, PCPs provide them to the patients during their appointments. The following quote by one participant illustrated this step: *“So, we have in our rooms some laminated preprinted forms. On one side is colonoscopy, on the other side is mammogram. So, this is something that the nurse will actually hand the patient to kind of start the conversation.”* Educational materials served as an additional tool to initiate the conversation and provide more information for the patients on CRC screening to ensure their positive response to CRC screening recommendations.

Patient-PCP conversation. Patients see their PCPs and have a conversation in a patient room. Participants noted that, during the wellness visit, PCPs have sufficient time to discuss all the preventive screenings including CRC screening. One nurse articulated, *“I know a lot of the doctors go ‘It doesn’t look like you had a colonoscopy done. Did you ever have one? Do you know why you should have one? Did you read the pamphlet that the gals gave you? Did you have any questions about it? Did you understand everything that it talked about? Do you have a family history? Is there someone in your family that’s had it, that we need to push you a little harder to think about it?’ But mostly it’s like ‘I don’t see a colonoscopy listed. Have you ever had one?’ I think that’s how a lot of them would start out.”* As illustrated by this quote, based on patients' past medical history, risks, and primary symptoms, PCPs go through the guidelines regarding CRC and make recommendations to have a CRC screening.

Recording patient's decision. Interviewees outlined three scenarios for patients' decision upon receiving a recommendation for CRC screening: (1) an agreement to proceed with the procedure, (2) needing time to think over, or (3) refusal to undergo the procedure. PCPs will record the patient's decision by inserting a note in the EMR system or on a patient paper chart. One respondent said, *“If they say they don’t want it or for whatever reason they refuse, we will note that in the flow-sheet. And then at their next appointment—one of the things is—that it will be brought up again. Because it will tell us in that protocol list, that at the last appointment they refused, or wanted to wait, or whatever it may be. So, then the provider will address it again, and try to go from there.”* As demonstrated by this quote, these records will be used for future appointments with those patients who refused to undergo CRC screenings. Additionally, PCPs informed other clinic staff, who oversee scheduling appointments to facilitate patient scheduling while they were still at the clinic.

Scheduling an appointment with the patient. Most clinics reported that they established a system to schedule an appointment for the procedure with the patients who agreed to get a CRC screening before they leave the clinic. This step is completed either by PCPs while they are still in the room with a patient, or by nurses and front desk staff when patients step out of the patient room. One interviewee articulated, *“If they agree to it, then I usually ask them, you know, if they have a preference who or where they wanna have it done, and if—write it on the encounter sheet and our gals get the consultation scheduled when they check out.”* With this step, patient preferences are discussed and depending on the availability of healthcare providers who perform CRC screening, patients may get appointments with in-clinic physicians, in-town specialists, or out-of-town specialists.

Post-visit activities

Participants reported front desk personnel, nurses and nurse coordinators as the main actors of the post-visit activities. They identified EHR and phone as the primary tools that facilitate their activities associated with CRC screening after patients' visit. Five themes emerged related to clinic processes on CRC screening in the post-visit phase: sending a referral letter, CRC screening follow-up with providers, patient-nurse interaction, patient follow-up after the procedure, and patient reminder and scheduling.

Sending a referral letter. Once patients' preference is identified for their screening, PCPs would send a referral letter and patient information to the provider who would perform the procedure. One interviewee described the referral process of their clinic by saying *“Well, anyway and at that time, if they decide to go ahead and do colonoscopy, then what happens is the doctor will order it, we have a referral coordinator, normally what happens is we send the information over to the specialist, because we go through the GI specialist here in this town, and they will call the patient, and get it set up from there.”* Clinics have a referral system in place and designated individuals who oversee CRC screening referrals, as the process generally involves providers outside of the clinic.

CRC screening follow-up with providers. For patients who agreed to undergo CRC screening, the participants reported that they would follow up with the providers who performed the procedure (in case of colonoscopy) and update patient information in their clinic system. One participant illustrated this step stating, *“So as far as when we decide to do a referral, and again I will make the phone call, give them the patient's information, have them call the patient, then they have their colonoscopy consult with the surgeon doing the procedure, and they will have that procedure done, and then usually I will send the letter of referral, I get the procedure note and follow up the patient as far as biopsy and things like that, give that information. We enter that then in an electronic record.”* In this step, nurses or front desk personnel are involved in several activities such as contacting the providers who would perform the procedure via phone to ensure the patients' information was received, colonoscopy consult, and procedures were scheduled for the patient. Once the letter of referral was sent and the clinic was informed about the procedure completion, the nurses would call patients to notify them on their results.

Patient-nurse interaction. Participants reported that the clinic staff interacted with patients after their clinic visit mainly via phone communication. Patients may ask nurses the questions about preparation for the procedure or discuss the results of their procedures. Many interviewees described their interaction with patients similar to this, *“Yes, I get quite a few calls on the prep, why do we have to do this way, this is how it is supposed to be done. Or if I do check the patients in, I will explain the colonoscopy, what is recommended, and I say you have not had one, and that kind of thing, I usually related my experience with it, tell them it is not as bad as they might think it is.”* Patients who plan to undergo CRC screening may have questions about their upcoming procedure and contact the clinics via phone. Most nurses noted that they engaged in the phone conversations with the patients making it informal and positive to help them reduce their anxiety of the procedure.

Patient follow-up after the procedure. Patients who had the procedure may also have another appointment scheduled after the CRC screening procedure to discuss the results. One clinic staff commented, *“There usually is a follow-up visit after their procedure. So, say we have – you know, if you're talking about colonoscopy or colon cancer screen, if we see a*

patient, they're due for their colonoscopy, we schedule it and then we usually will see the patient back a week after their colonoscopy to discuss their findings and results and pathology, if there's pathology." In cases, especially when the results of the screening needed to be discussed to take further actions, clinics often scheduled another appointment with the patients to discuss their treatment options in detail.

Patient reminder and scheduling. Most clinics reported that they would contact those patients who hesitated and did not set up an appointment for CRC screening at their last appointment to inquire about their decision and recommend scheduling an appointment. Only a few clinics stated they may contact those patients who refused to undergo CRC screening. One participant said *"Say the patients get up there and say well, I wanna wait three months, because of blab la bla...whatever reason. So she will put the order, the patient will wait until December to do and change the date, so that order will repopulate again at around that certain dates. They can call them and set up the schedule, if the patient wants to do in the next few weeks, so that [the person's name] call our surgery department at the hospital and see what their schedule looks like opening wise, so on and so forth."* As demonstrated by one clinic's description of this step, clinics were more proactive with the individuals who wanted to wait or needed some time to think about the CRC screening by following up with them via phone communication after their clinic visit.

Discussion

To our knowledge, this is the first qualitative study that explored the entire clinic process for CRC screening broken down into three stages. Our study provided an in-depth description of the activities currently being practiced in ten ACO clinics before, during, and after patients' visit. Our study also found dynamics among healthcare professionals in this new healthcare delivery model (ACO) and member clinics in promoting CRC screening in their communities. Our findings warrant in-depth discussions in the following three areas: (1) team-based approach of CRC screening recommendation at primary care, (2) utilization of advanced functions of electronic health records, and (3) various reminder strategies for recommending CRC screening for both providers and patients. Analysis of activities in each of the three stages also enabled to identify areas for improvement in ACO clinics.

We observed team-based approaches in most clinics and learned that providers perceived team-based care as a facilitator for CRC screening (Kim et al., 2017). In some clinics, nurses/nurse coordinators/ front desk personnel noted that they initiate conversation with patients about CRC screening before they see a physician. Their conversation may consist of words of encouragement and explanation of the benefits of CRC screening. This illustrates how nurses/nurse coordinators/front desk personnel can share the burden of CRC screening recommendation and help patients and providers get ready for having some further conversations about CRC screening. Previous research supports the use of a multidisciplinary team and support system to be effective for increasing CRC screening (Hudson et al., 2007). Teamwork was also recognized as key to identifying patients for cancer screening in the previous studies (Martinez-Gutierrez et al., 2013). Particularly, a team approach was found efficient in studies where specific prevention responsibilities were designated to non-physician staff (Arroyave, Penaranda, & Lewis, 2011). In a study of CRC screening quality improvement initiative, Stroud and colleagues (Stroud, Felton, & Spreadbury, 2003) reported that referrals to sigmoidoscopy, colonoscopy, and double-contrast barium enema increased from 47% to 86% in the 3-month trial initiative when primary care clinic entire staff and the gastroenterology office took part in the referral process. Another study, conducted in a federally qualified health center, showed that having a separate visit and non-physician staff member

assigned to cancer screening was perceived as an effective strategy (Martinez-Gutierrez et al., 2013). The evidence shows that the delivery of preventive screening can be improved when the responsibilities are effectively shared among all team members.

Even though there are studies that examined team-based care or multidisciplinary team care in CRC screening, there is a lack of description of how team-based care activities are being conducted in different care settings, including roles and responsibilities of each team member and associated communication tools. The qualitative nature of our study enabled us to contribute to the team-based care in CRC screening in that we described the process of team-based care in rural ACO clinics which illustrated specific roles of each team member, the dynamics of communication between team members and tools/strategies used by team members to facilitate the care process. It is essential to know these elements in defining team-based care to further explore its impact on CRC screening which could only be explored qualitatively.

Enhanced electronic health record use was perceived as a helpful tool by rural practitioners in recommending CRC screening at ACO clinics. The study participants stated that they saw the value of using enhanced features of EMR in making the care process more efficient through reducing time for patient records search and retrieval, enhancing communication between nurses and doctors with instant messaging function, and identifying the list of patient populations who are due for CRC screening through “create report” function (Kim et al., 2017). Our study findings echoed several previous studies that noted the benefits of EMR use in oncology care (LeBlanc, Back, Danis, & Abernethy, 2014). Despite the general concern that interacting with the computer in the clinics may hinder provider and patient communication, Blanc and colleagues’ study (LeBlanc et al., 2014) note that careful attention to the use of EMR in oncology clinic has a potential to improve communication in the clinics. Another study by O’Malley (O’Malley, Draper, Gourevitch, Cross, & Scholle, 2015) points to the benefits of EMR use in enhancing communication and task delegation in primary care teams via the use of functions such as instant messaging, task management software, the creation of evidence-based templates for symptom-specific data collection from the patient by non-physician staff. However, we do want to note that not all clinics have the capacities of using advanced EMR functions. Even within ACO clinics, some clinics are still using the basic level of EMR use due to limited IT related capacities (Kim et al., 2017).

Use of reminders is another aspect of ACO clinic care process that facilitates CRC screening, as study participants noted that they are using reminders in different stages of CRC screening recommendation in their clinics. Reminders are effective tools that positively affect clinic performances (Stone et al., 2002). The reminder is the way to prompt providers and patients to use preventive services, and computer-aided or manual reminders could be delivered verbally, on paper, or on a computer to providers and patients (Stone et al., 2002). Previous research also points to the effectiveness of reminders. Features of reminders to providers such as providing a space for the provider to enter a response and providing an explanation for reminder were found to be effective, as using these features may increase the likelihood of physician attention to the reminder and encourage them to respond to the reminder (Litzelman, Dittus, Miller, & Tierney, 1993). In a study conducted by Stroud and colleagues (2003), through using reminders and other tools in CRC referral process, the primary care clinic in Health Texas provider Network increased their referrals from 47% to 86% in a three-month trial initiative that was implemented at other clinics in their network following their trial. Wang et al.’s study on the multilevel analysis of barriers and facilitators of CRC screening in these clinics showed that patients with a PCP who manually checked CRC screening status during their visits were more likely to be up to date on CRC screening. However, an automatic reminder system or reminder by a care coordination team alone was not sufficient to increase CRC screening for the patients. An effective reminder system may require the coordination

with and dedication of the PCPs (Wang et al., 2018). In addition to the evidence from previous studies, the findings of our study suggest that reminders can be used in different stages of CRC screening recommendation by multiple staff members and being part of ACO could be a strong factor for the use of various sets of reminders in different stages. However, as noted from Kim et al.'s study, rural primary care clinics may experience difficulties in using computer-aided reminder system because the reminder system is only helpful when patient data (e.g., colonoscopy every 10 years) are appropriately inserted in the system (Kim et al., 2018).

Lessons learned

There are several steps in the CRC recommendation process that need to be noted. In the pre-visit process, a few clinics use standard mailed letters to recruit patients for CRC screening through annual wellness visits. Although reminder mailings were found to be effective to increase cancer screenings such as mammography and Papanicolaou test rates (Bankhead et al., 2001; Binstock, Geiger, Hackett, & Yao, 1997; Saywell et al., 2003; Vogt, Glass, Glasgow, La Chance, & Lichtenstein, 2003), they may have effect only on individuals who have the intention to attend the timely screening in the future or up to date for screening. For the individuals who are not highly motivated to take part in screening, more intensive interventions may be necessary. Previous studies demonstrated that more aggressive outreach interventions were effective (Myers et al., 1991; Myers et al., 1994) indicating that clinics may need to apply more aggressive strategies in targeting unmotivated individuals. Church and colleagues (2004) used the four-step approaches to remind clients for CRC screening: initial mailed letter, 2nd mailing after a month, 3rd letter with FOBT packet, followed by phone calls.

In analyzing “during-the-visit” process, we identified several areas that may need to be taken into consideration for improvement. Health maintenance visit (or wellness visit) has been cited to be the most significant predictor of cancer screening (Ruffin, Gorenflo, & Woodman, 2000). An annual wellness visit is the time when most of the preventive services are discussed and recommended to the patients by the healthcare providers, however, there are individuals who may not keep their routine preventive visits and attend clinics only when they encounter some urgent medical issues. According to a previous study, only 30% of patients had a wellness visit during the past 12 months based on retrospective patient records analysis in rural ACO (Wang et al., 2018). Although most clinics in our study make efforts to address CRC screening during episodic care visits, lack of time due to prioritizing the urgent medical issue of the patients do not allow healthcare providers to recommend CRC screening during those visits. Similarly, lack of time to the provision of preventive care (Yarnall, Pollak, Ostbye, Krause, & Michener, 2003) and the need to address the urgent medical concern of the patient are cited as frequent barriers to make CRC screening recommendations during episodic care visits (Hatcher, Dignan, & Schoenberg, 2011). To increase CRC screening rates, it is necessary for ACO clinics to effectively use the time for each patient visit to make CRC screening recommendations. Therefore, understanding the whole CRC recommendation process can benefit healthcare providers at ACO clinics to see where opportunities for CRC screening are missed in the clinic process and prompt to take steps not to miss CRC recommendation during episodic care, by saving their time through sharing tasks with other staff members (e.g., preparing patient information) or through receiving reminders.

Another activity “during-visit-process” to be improved is the provision of educational materials/handouts to patients. Although all clinics have educational materials/handouts on CRC screenings, several physicians mentioned they provide educational materials on CRC screening to patients when they meet them. In a study of quality improvement initiative on CRC screening, nurses provided educational material to all patients who did not receive any recommendation before, or who failed to complete suggested screening. This way the

opportunity for patients to ask questions about CRC or screening process was created. This initiative was successful with the increase in CRC referrals from 47% to 86% in a three-month period (Stroud et al., 2003). ACO clinics should provide more educational materials and handouts to patients which could also be provided by clinic staff other than primary care providers.

Another critical process during the post-visit activity was patient “follow-up.” Some ACO clinics actively engage in the activities of the patient follow-up, particularly who agreed to undergo CRC screening. For example, if a patient does not make an appointment during their clinic visit, the clinic staff may make a call to set up the date and time for the procedure, and also make another call to remind the date of the appointment after they finalize the date, and another one to discuss the results. In the case of referrals, clinics may contact the health care providers whom the patients were referred to for CRC screening to discuss the appointment time, and following the procedure, clinics may contact them to request the results of the procedure to update patient information.

Although some clinics are in the process of implementation of follow-up as part of their QI projects for patients who refused, still most clinics have no established follow-up protocol for those who refused. Developing more aggressive interventions to follow up with patients who refused may be beneficial in the uptake of CRC screening for ACO clinics. Previous research points to strategies such as patient activation (Katz, Fisher, Fleming, & Paskett, 2011), a patient navigator-based intervention in combination with a letter from the primary care provider to be associated with an increase in CRC screening (Lasser et al., 2009).

Study strengths and limitations

Through health care providers’ perspectives, this study contributes to the understanding of the clinic-level care process strategies to promote CRC screening in the new US delivery system of healthcare reform in a rural setting. In rural areas where healthcare providers face additional barriers to promote CRC screening, it is beneficial to understand and identify the areas they can improve upon strategically utilizing the existing clinic resources such as workforce and technology which will ultimately improve their patient outcomes. Additionally, this study also contributes to the evidence of team-based care of CRC screening in a rural setting, as the process of team-based care and dynamics between team members in providing team-based care were described in depth.

This study has several limitations. The sample size of the study is small (n=21). Nevertheless, the qualitative interviews with the healthcare providers provide in-depth information regarding health professionals’ perspectives on clinic mechanisms, team dynamics, and technology use in CRC screening recommendation process. The sample of the study is rural ACO primary care clinics in a Midwestern state, and therefore the generalizability of the study is limited to other settings. However, despite this limitation, rural primary care practitioners may benefit the study findings with rich information on clinic care processes and consider adopting similar strategies to improve CRC screening at their organizations. Lastly, these study findings only reflect perspectives of healthcare providers on the process of CRC screening in ACO clinics, hence the patient view on clinic care process is lacking which might differ from healthcare providers.

Future research

Although the evidence indicates progress in CRC screening overall, there is still much work to be done, particularly in a primary care setting. This study was not designed to determine if adoption and implementation of certain activities in the CRC recommendation

process at the ACO clinics were associated with the increase in CRC screening rate at a clinic level. Future research should focus on exploring this aspect by examining the association of clinic screening process activities and screening outcome. Studies that explore how challenges of rural setting compared to urban setting posed to ACO clinics' screening processes affect clinic screening outcomes are also needed.

The challenges of providing services in the context of primary care are real, and CRC screening in a primary care setting can be complex requiring the involvement of multiple level staff members in a multiple step process. Studies that test multilevel intervention strategies that consider the context of the screening process, setting, teamwork, and healthcare delivery mechanism and the interaction of these multiple levels should be the focus of the future research studies. Given the limited evidence on the impact of team-based care on CRC screening, more empirical studies are needed to examine the effects of team-based care on CRC screening particularly in rural areas and health professional shortage areas.

There are advantages of exploring healthcare providers' perspective on CRC screening recommendation process. However, without a patient perspective, we may not see the complete picture of all factors and barriers associated with the care process. Future research should also explore how the ACO clinic care process is perceived from the standpoint of individuals who are on the receiving end of the care process.

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