

Barriers and facilitators for colorectal cancer screening in a low-income urban community in Mexico City

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Abstract

Background. Colorectal cancer (CRC) incidence and mortality are increasing in many middle- and lower-income countries, possibly due to a combination of changing lifestyles and improved healthcare infrastructure that facilitates diagnosis. Unfortunately, a large proportion of cases may be diagnosed at advanced stages, resulting in poor outcomes. Decreasing trends in higher income countries are likely due to improved early detection combined with best practices in CRC treatment and management. More data on implementation of better quality CRC screening programs are needed for contexts where incidence is increasing. Therefore, we sought to identify potential barriers and facilitators for future implementation of fecal immunochemical test (FIT)-based CRC screening in a public healthcare system in a middle-income country with increasing CRC incidence and mortality.

Methods. Qualitative study including semi-structured individual and focus group interviews with different stakeholders of colorectal cancer screening: 30 average-risk lay people, 13 health care personnel from a local public clinic, and 7 endoscopy unit personnel from a cancer referral hospital. All interviews were transcribed verbatim for analysis. Data was analyzed using the constant comparison method, under the theoretical perspectives of the Social Ecological Model (SEM), the PRECEDE-PROCEED Model, and the Health Belief Model.

Results. We found multiple barriers and facilitators for implementation of a FIT-based CRC screening program at different levels of the SEM. The main barriers in each of the SEM levels, were: 1) at the social context level: poverty, health literacy and lay beliefs related to gender, cancer, allopathic medicine, and religion; 2) at the health services organization level: the lack of CRC knowledge among health care personnel and the community perception of poor quality of health care; 3) at the individual level: a lack of CRC awareness and therefore lack of risk perception, together with fear of participating in screening activities and finding out about a serious disease. The main facilitators perceived by the participants were CRC screening information and the free provision of screening tests.

Conclusions. This study's findings suggest the need for a multi-level CRC screening program that includes complementary strategies aimed at reducing perceived barriers and enhancing facilitators, starting with: 1) free provision of screening tests, 2) education of primary health care personnel, and 3) promotion of non fear-based CRC screening awareness among the target population, taking into account their lay beliefs.

Contributions To The Literature

- In low- and middle-income countries there is a gap in the integration of qualitative research findings into the design of sustainable cancer screening programs.
- Designing culturally appropriate colorectal cancer screening interventions is necessary as barriers and facilitators for screening completion in other countries may not be sufficient to inform program implementation.
- Our study highlights the relevance of qualitative methods to uncover context-specific barriers and facilitators as perceived by the different stakeholders as a prior step to the design of health interventions in a middle-income country.

Background

Colorectal cancer (CRC) is preventable and curable with screening and early detection, yet it remains a leading cause of cancer mortality worldwide.(1) CRC incidence and mortality varies by country and region but is increasing in lower- and middle-income countries while decreasing trends have been observed only in some higher income countries, where rates nevertheless remain high.(2) CRC results in approximately 800,000 deaths per year globally, with most of these deaths occurring in low and middle-income countries (LMICs).(3) Most of these deaths could be avoided with implementation of screening programs, as indicated by the decreasing trends in CRC incidence and mortality in some high-income countries.(2, 4) Evidence from randomized clinical trials has formed the basis for international guidelines(5–7) recommending CRC screening for at-risk adults, and reflect different approaches to screening including stool-based tests and visual exams of the colon and rectum.(4)

Stool-based tests, including the fecal immunochemical test (FIT), guaiac-based fecal occult blood test (gFOBT), and fecal DNA tests, are highly sensitive and non-invasive. However, they lack specificity, require serial testing at short intervals, and a subset of patients must still undergo direct visualization following receipt of a positive result. Visual exams of the colon and rectum, including colonoscopy, flexible sigmoidoscopy, and computer tomographic colonography offer enhanced specificity but are more invasive and costly. In resource-constrained settings, the use of non-invasive stool tests offers the advantage of higher screening uptake and lower demand on endoscopy resources.(4)

In Mexico, as in other middle-income countries, CRC incidence and mortality are on the rise, possibly due to the combined effect of changing lifestyles and the improvement of healthcare infrastructure to facilitate diagnosis.(8) Unfortunately, a large proportion of cases are diagnosed at advanced stages, resulting in poor outcomes.(9) Even though the Mexico's National Clinical Practice Guidelines recommend annual gFOBT for average-risk individuals, efforts to formally implement CRC screening programs in Mexico are nascent.(10) As data about the implementation of fecal immunochemical test (FIT)-based CRC screening could be useful to healthcare systems in a number of contexts, including Mexico, we first sought to identify potential barriers and facilitators for the future implementation CRC screening in Mexico City.

Methods

Study setting and design

We undertook a qualitative study and report according to the standards for reporting qualitative research (SRQR).(11) We collected data using semi-structured individual and focus group interviews with lay people representative of the average-risk population for CRC screening, primary care providers and endoscopy unit personnel.

We selected a low-income urban community of approximately 20,000 people located in the Tlalpan district of Mexico City. We chose this community because of its high levels of marginalization, capabilities of the community-based clinic, and apparent accessibility to the Instituto Nacional de Cancerología (INCan), a national cancer referral hospital with an Endoscopy Unit in Mexico City (approximately 10 km and 40 minutes

away via public transportation). The community clinic selected (Cultura Maya clinic) provides services for uninsured patients and those covered by a governmental health insurance program called Seguro Popular. It employs 11 physicians, 16 nurses, and 7 social workers and offers free primary care services, basic x-ray imaging, and routine laboratory tests; colorectal cancer screening is not currently offered as a part of routine care. At the time of this study, the clinic served an estimated 4,213 adults between the ages of 50 to 74, which is considered as the population at-risk for CRC according to U.S. guidelines.(12)

Study participants

We had three groups of participants. The “community participants” group was composed of lay people residing in the vicinities of the Cultura Maya health center. The “primary healthcare participants” included health care personnel employed at the Cultura Maya clinic (i.e. social workers, nurses, and primary care physicians). Finally, the “endoscopy unit participants” were health care personnel laboring at INCan’s Endoscopy Unit (i.e. endoscopists, nurses and screening program administrative personnel).

Theoretical perspectives

This study was guided overall by the broad theoretical perspective of the Social Ecological Model (SEM).(13) This model emphasizes the interaction and interdependence between factors within and across all levels of a health problem or behavior: intrapersonal or individual, interpersonal, institutional or organizational, community, and public policy levels. We also used the PRECEDE-PROCEED (Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation - Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) model to guide the analysis of the CRC screening program planning process.(14)

Based on the premise that an educational diagnosis of the problem is essential before development and implementation of the intervention plan, the current study focused only on the PRECEDE phase. Our analysis of individual or intrapersonal factors was guided by the Health Belief Model (HBM).(15) HBM addresses an individual’s perceptions of the threat posed by a health problem (perceived susceptibility and perceived severity), the perceived benefits of avoiding the threat and factors influencing the decision to act (perceived barriers, cues to action, and self-efficacy).(16)

Data collection

We used semi-structured, open-ended questions to ask participants about their perceptions of barriers and facilitators, knowledge, attitudes, and beliefs about CRC and CRC screening, and strategies for motivating behavior change among lay people and health personnel. Data were collected between September 2018 and January 2019. We conducted a total of 22 semi-structured interviews and three focus group interviews with 28 community participants, to achieve saturation with a total of 50 participants: 13/22 interviews were with primary care personnel, 7/22 with endoscopy unit participants, and 2/22 with community members..

Community participants were recruited by two social workers from the local health clinic, each covering a different geographic area, and by outreach through a local support group for the elderly. We stratified focus groups by gender in an effort to facilitate a more open discussion. We conducted two focus groups in women

(20 total participants) and one in men (8 participants). The focus groups were led by two experts in qualitative research (KUS and MST), with one moderating and the other assisting with organization and on-site coding of responses. We also collected demographic data from all community participants including age, marital status, years of education, family income, and housing characteristics.

After the initial open questions regarding knowledge about CRC and CRC screening, we provided basic information on these topics to the participants in order to elicit their perceived barriers and facilitators for implementation of FIT-based screening and colonoscopy. The interviews with primary care providers and community participants took place in a private room at the community health clinic in Tlalpan, and those with endoscopy personnel at INCan's Endoscopy Unit. Individual interviews lasted between 30 and 60 minutes, and focus groups lasted between 60 and 90 minutes. Community participants received a gift card valued at 10 USD as a small token of compensation. All interviews were carried out in Spanish, audio recorded, and transcribed verbatim.

Data analysis

All data was de-identified prior to transcription. Transcripts and field notes were organized with Atlas.ti software to aid the analysis. Data was coded by two researchers using the constant comparison method under the SEM, PRECEDE-PROCEED, and HBM theoretical perspectives.(17) The coding results were then reviewed with adjudication in the cases of differing results, reaching consensus between the two coders to establish the final codes. Data saturation was achieved with the last focus group and, therefore, no more participants were recruited. To determine saturation, we used the on-site coding to determine when no new codes appeared and each of the codes had been applied to a sufficient amount of data.

Results

A total of 30 community members and 20 healthcare providers participated in the study. Participant characteristics are summarized in **Tables 1 and 2**. Following the PRECEDE-PROCEED model, we organized our findings into two broad categories: (1) barriers and (2) facilitators of CRC screening. Additionally, each barrier and facilitator was classified within a level of the Social Ecological Model. **Figure 1** summarizes our findings. It represents the perceived barriers and facilitators for participation in a CRC screening program in this community at the different levels of the Social Ecological Model, where all levels interact with each other. Representative examples of participants' quotes for the most relevant codes are presented in **Tables 3 and 4**.

Perceived Barriers to CRC screening

Health policy barriers

Barriers at this level were identified only by healthcare providers employed at the Endoscopy Unit at INCan, who reported numerous barriers to the expansion and sustainability of INCan's current CRC screening program. Identified barriers included: budget constraints, lack of interest from policy makers leading to insufficient promotion of CRC screening, and dissemination of inaccurate information about CRC in mass media campaigns.

Social context barriers

Poverty was the most commonly perceived barrier to uptake of CRC screening, as reported both by community participants who would be the targets of screening and the primary healthcare providers who serve this population. Participants in all groups consistently brought up concerns about costs of tests and described living conditions that prevail in the area and the daily difficulties that patients face to cover basic needs (e.g., drinking water, food, and medicines). Among elderly male participants, most complained about the difficulty finding work at their age. Among the female participants, several reported being completely dependent on government programs for food and medical care.

Belief systems about cancer, health in general, and medical treatments were identified as another social context barrier. For example, community participants spoke about the commonly shared fatalistic view of cancer as a death sentence accompanied by suffering, pain, and expensive treatments that have a negative economic impact on the family. They also spoke about a common attitude of carelessness towards one's health, reflecting the perception that many take health for granted. They shared the observation that many do not prioritize preventive health care and postpone health service utilization until symptoms are severe. Moreover, the role of gender with regard to beliefs about health was consistently mentioned by participants from all groups, with the shared impression that men are less likely to utilize healthcare services than women. Many attributed this to men being less concerned about health than women. Additionally, community participants thought that having a colonoscopy would be harder for men to accept due to the anal penetration associated with the procedure, with possible sexual associations. One more barrier related to gender beliefs that could potentially affect the uptake of colonoscopy by women in Mexico is *machismo* or a sense of masculine pride that includes control over the female partner. Some participants described the possibility that some men may forbid their wives from seeking medical care, particularly if the doctor is a male and the consultation could require a woman to show intimate parts of her body.

Numerous participants in all groups perceived the lack of knowledge about CRC and CRC screening among community and primary healthcare participants as a relevant barrier. In particular, community participants lacked even basic knowledge about CRC and saw lack of knowledge as a barrier to participation in screening. Few community participants had heard of colonoscopy and knowledge of the procedure was limited. None of our community participants had heard about FIT as an option for CRC screening. The primary health care personnel possessed little knowledge about CRC and options for screening.

Finally, there were characteristics of the community that primary healthcare providers perceived as barriers for a successful implementation of a CRC screening program. The health workers perceived the population they serve as poorly educated. They described it was challenging for them to understand instructions for participation in diagnostic tests, for management of chronic conditions (e.g., diabetes), and therefore for adhering to treatment and follow-up. Also, the primary healthcare providers perceived the community as accustomed to participating in health programs in response to incentives (e.g. food parcels), which is a common practice with the delivery of social programs in Mexico. The primary care participants also described street violence as a barrier to provide outreach in certain neighborhoods. They also commented on the community's cultural diversity, with migrants from different ethnic origins, which in their view further complicates the primary care personnel's usual outreach activities. Finally, primary care providers reported

that it is common for a significant proportion of community turnover due to migration from and to other states in Mexico or even change of residence within the city, and this could pose challenges to successful follow-up of individuals with positive FIT results.

Health service organization barriers

Community participants perceived the following potential barriers to participation in CRC screening: (1) previous experiences of patient abuse or mistreatment in healthcare; (2) poor quality of health services; and (3) challenges in doctor-patient communication. Several participants, including primary care physicians, shared negative personal experiences as patients in public health services that have subsequently prevented them from seeking care. These included perceived poor quality of care as well as stories of patient abuse where participants felt they were discriminated against due to their low-income status or appearance. Finally, community participants complained about not getting satisfactory explanations from healthcare providers about their health conditions, details for the rationale of medical recommendations related to screening and treatment, and wording that is easy to understand. Also, they said they wished doctors were more empathetic towards their life experiences.

At the primary care clinic level, the most prominent barriers perceived by our two groups of health care personnel participants (primary care and endoscopy unit) were: (1) lack of CRC knowledge among the primary care providers; (2) work overload in the primary care clinic; (3) insufficient infrastructure, personnel, and supplies; and (4) resistance to or lack of interest among primary care personnel in participating in new programs. The second barrier listed appeared to be a central issue: a majority of healthcare providers identified work overload as a significant problem, articulating that it would be very difficult to recommend screening during patient visits due to numerous competing medical priorities and short consultation times during patient visits. They also complained about having too much administrative workload, which reduces time for direct patient contact. Additionally, healthcare personnel referred to the daily challenges of doing their job in the midst of insufficient infrastructure, lack of supplies, and inadequate staff. Also, they perceived the lack of interest among staff and their resistance towards participation in new programs as an expression of fear regarding impact on an already heavy workload.

Finally, community participants described as potential barriers (apparently based on previous experiences), the long waiting times for referrals to other hospitals, complicated administrative procedures, and long distances for transportation to the health services. Although INCan is located only 10 km away from the community, distance was perceived by the community population as a barrier specific to getting a colonoscopy at the Endoscopy Unit of INCan, as public transportation is limited and can take much longer than private transportation.

Interpersonal barriers

At the interpersonal level, one of the endoscopists mentioned that negative colonoscopy experiences among peers might influence the uptake of this procedure. Among our community participants, nobody knew anyone who had a colonoscopy; however, one female participant narrated to the rest of the group a horrible

experience with the sedation of her son during an endoscopic procedure and expressed her fear of submitting herself to something similar.

Individual barriers

One of the most evident barriers was lack of awareness about CRC among community participants. A majority of participants openly acknowledged not knowing anything about CRC and were unable to identify the location of the colon. Once information on CRC, FIT-based screening, and colonoscopy was provided, the most commonly reported barrier was fear. Participants discussed the fear of finding out they have a serious disease like cancer. Three additional kinds of fear came up in relation with colonoscopy: (a) fear of pain; (b) fear of not knowing what to expect during the procedure; and (c) fear of embarrassment regarding the actual colonoscopy procedure, particularly among the male participants.

Community participants also reported lack of time for utilizing health services due to personal obligations and daily life activities. Male participants mentioned fear of losing their jobs, and female caretakers consistently put their families' needs before their own. Respondents explained that community members have too many competing responsibilities, and preventive health care is not a priority.

According to participants, preferences for traditional rather than allopathic medicine, particularly among people who migrated from rural areas to Mexico City, were identified as a potential barrier to participation in CRC screening. Reluctance to use health services due to distrust of healthcare providers was consistently reported. Other barriers that were mentioned were lack of self-care, low self-esteem, procrastination, disinterest in health, and low perceived risk of CRC.

Perceived facilitators for participation in CRC screening

Health policy facilitators

Only health workers at the Endoscopy Unit identified facilitators at this level of the Social Ecological Model. In their opinion, mass media campaigns about the relevance and recommendations of CRC screening have potential to increase awareness in the target population.

Social context facilitators

Health workers at the primary care clinic perceive that the population they serve has been highly engaged in other health programs offered in the past. They perceive that this openness of the community to participate in health programs could facilitate uptake of CRC screening.

Health service organization facilitators

The main perceived facilitator for screening participation by all participants was that FIT kits and colonoscopy be offered at no cost. Another key facilitator identified by both healthcare personnel and community participants was promotion of CRC screening at community clinics. They hypothesized that people would participate in CRC screening if the primary care physicians were mandated to give information and request a CRC screening test from all their patients >50 years. Other relevant facilitators for FIT uptake

were: (1) availability of the FIT kits at the local clinic; (2) possibility of reception of completed FIT samples at the local clinic; (3) good doctor-patient relationships with satisfactory communication skills among doctors; and (4) a history of positive experiences with health service utilization. For uptake of colonoscopy, the opportunity to have the procedure done by a physician of the same gender was seen as a facilitator.

Primary care personnel commented on the need for appropriate work environments. A majority reported that motivating the primary care personnel to participate in the CRC screening program would be a facilitator to successful implementation of the program. Finally, in order to improve their CRC screening knowledge and communication skills, primary care personnel suggested the use of short informative videos. They commented on the importance of observing others to learn medical procedures, which could also be applied to learning to communicate more effectively regarding the relevance of CRC screening.

Interpersonal facilitators.

Some community participants reported that knowing someone affected by cancer, particularly a family member or a close friend, would be a motivation to participate in cancer screening. Social support was also considered an important facilitator. Many reported that it would be easier for them to participate in screening if a family member or friend encouraged them to do so or shared with them a personal positive experience.

Individual facilitators

Almost all participants expressed that access to information on CRC and the benefits of screening is an important facilitator. The community participants were very interested in receiving more information about CRC screening and prevention. The information they received in the focus groups made them feel at risk (and this risk perception was accompanied by the knowledge that the cancer could be detected early and treated), and several mentioned this perception as a motivation to participate in CRC screening. Other potential facilitators were that the participants perceived sample collection for the FIT test and return of the kit to the health center as simple procedures. Knowing that the test could be done at the privacy of their homes was seen as an advantage. Finally, having personal experiences with serious illnesses came up as a facilitator. Some participants reflected upon their own negative health experiences and said that they were willing to participate in any screening activity that would prevent them from additional suffering due to health issues.

Discussion

We identified multiple barriers and facilitators to successful implementation of a FIT-based CRC screening program in a low-income urban community in Mexico City. The main barriers at the social context level were poverty, health literacy, and community health and gender-related beliefs. At the health services organization level the lack of knowledge of CRC among health care personnel and common perception of poor quality of health care services provided at public facilities were identified as major barriers. We identified lack of awareness about CRC risk and fear of serious disease as the preeminent barriers at the individual level. The major perceived facilitators for a CRC screening program were health education on CRC screening and access to screening tests at no cost to the patient.

Previous studies have reported similar barriers to the ones observed in the current study. At the social context level health beliefs and attitudes, like fatalism(18–20), sexism, and stigma related to the digital rectal exam(21) have been reported in several studies. At the level of the health system/ health services level the following barriers have been previously reported: negative experiences with healthcare services or poor perception of the quality of healthcare provided by personnel(22, 23), insufficient explanations by doctors about the evidence to support use of the screening studies(24), lack of confidence in the health system(25–27), difficulties with appointments, referrals, long waiting times and failures in reminders(28, 29), and access problems due to health insurance and test costs(23). At the interpersonal level, lack of social support has also been reported as a barrier to CRC screening participation(30). Finally, at the individual level, previously reported barriers include lack of knowledge about detection and disease(22, 31–34), underestimation of CRC risk(35, 36), procrastination(37), fear of a cancer diagnosis (21, 28, 34, 37–39), fear of discomfort or pain during colonoscopy(34, 40, 41), and shame about getting a colonoscopy(34, 40, 41). Our study participants perceived as hypothetical facilitators the removal of financial barriers and implementation of educational interventions for patients and providers. Both of these have also been found to be among the most successful facilitators of CRC screening in other countries where screening programs have been piloted or are already in place. (26, 42, 43)

Contrary to research findings from countries such as Spain(44), the Netherlands(45), the United Kingdom(46) and the United States(43), our study subjects did not report taboos or unpleasantness of handling stool samples as a significant barrier to patient participation. Awareness of CRC screening was highly deficient among our participants at baseline, but once they were given information on CRC, the benefits of screening and the details regarding the screening tests, interest in participating in the collection of stool samples for the FIT was high, and no concerns regarding the actual procedural aspects were expressed.

CRC screening recommendations and screening programs are highly variable around the world, in part due to variations in CRC incidence, economic resources, and healthcare infrastructure.(4) In general, organized population-level CRC screening programs only exist in high-income countries (HIC), mainly in Western Europe, Japan, Australia and several provinces of Canada.(4) However, efforts to establish organized CRC screening programs are emerging in a few countries in Latin America which are impacted by disproportionately high rates of CRC, including Argentina, Brazil, Chile, and Uruguay.(4) Feasibility and cost-effectiveness studies are critical to guiding decisions by policymakers regarding the appropriateness of investment in organized CRC screening programs, as well as to determine the most cost-effective CRC screening modality for a particular setting. Qualitative research studies conducted prior to program design and implementation, engaging stakeholders at multiple levels of the social ecological model, and aimed at identifying local barriers and facilitators, can provide valuable information to increase the likelihood of successful program adoption, implementation, and sustainability.

Our findings highlight the need for culturally appropriate CRC screening interventions that address perceived barriers and facilitators for successful implementation. First, it is relevant to consider the characteristics of the target population. Individuals and populations afflicted by poverty are likely to prioritize fulfillment of basic needs over preventive services.(47, 48) Once participants in our study received information regarding CRC screening, most expressed a willingness to participate in CRC screening, although test costs were

perceived as a very important barrier. Therefore, access to tests free of charge needs to be guaranteed if people living in limited-resource settings are to be targeted by screening programs. In the Mexican context, diagnostic colonoscopies are not currently covered by the national health insurance plan that was in place when this study was carried out, Seguro Popular, and efforts are ongoing to address the critical need for downstream capacity and coverage for the diagnostic colonoscopies that are necessitated by a positive FIT result.

Second, the knowledge gaps about CRC risk among members of the primary healthcare team, including physicians, emerged as a very important barrier to target prior to implementation of a CRC screening program. Primary care personnel need to be educated about the relevance of CRC: the epidemiologic burden, the role of screening for prevention and early detection and the specific feasible screening recommendations, as well as cultural competence and communication skills relating to promotion of screening.(49) Finally, increasing awareness of CRC among the lay population will be critical to create familiarity with the recommendation for screening.(50) Addressing these barriers thoughtfully and sequentially will be necessary to ensure that access to screening and diagnostic tests are well-established before promoting awareness among the at-risk population, in order to avoid escalation of a health need that the health system is not prepared to meet.

Some limitations of this study need to be acknowledged. First, study participants were instructed by focus group facilitators to speak on behalf of cultural views that would be representative of their communities, though participants were not restricted in the actual discussions and may also have provided personal views. However, we believe this information is valuable as well, as personal views are often a reflection of shared cultural values. Also, we recognize that there is important demographic and socioeconomic heterogeneity within Mexico City that may not be reflected in our sample. The neighborhoods sampled were among the poorest in Mexico City, but results may not be entirely generalizable to communities with higher income levels. However, to address this issue, we purposefully sampled individuals of different gender and age from different neighborhoods surrounding the clinic. We also included a multidisciplinary sample of healthcare personnel who would be directly involved in implementation of a community-based CRC screening program. This purposefully sought gender, age and multidisciplinary heterogeneity of our 50 participants allowed us to achieve data saturation. Because poverty remains highly prevalent in Mexico City, the types of barriers and facilitators perceived by our informants are likely to be representative of a large proportion of neighborhoods across Mexico City.

Conclusions

We identified three main barriers to CRC screening in a low-income, urban community in Mexico City: 1) a need for free provision of FIT tests and diagnostic colonoscopies; 2) training for primary health care personnel; and 3) promotion of CRC screening awareness among the target population. As we consider steps necessary for the implementation of a successful CRC screening program among marginalized communities in Mexico City, we aim to create an intervention that is implemented through a well-coordinated multidisciplinary team that includes all these complementary elements. Our future research activities will aim

to address each of these three barriers in a stepwise fashion through a multi-level approach that engages policy makers, stakeholders within multiple healthcare settings, and community leaders and members.

Abbreviations

CRC	Colorectal cancer
FIT	Fecal immunochemical test
gFOBT	Guaiac-based fecal occult blood test
HBM	Health belief model
HIC	High income countries
INCan	Instituto Nacional de Cancerología (Mexican National Cancer Institute)
LMIC	Low and middle-income countries
PRECEDE-PROCEED Model	Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation - Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development Model
SEM	Social Ecological Model

Declarations

Ethics approval and consent to participate. The study received approval from the institutional review board at INCan and was considered exempt at UCSF (19-27349). Written informed consent was obtained from all participants prior to recruitment.

Consent for publication. Informed consent was also obtained for publication of participants' responses. No personal data is included.

Availability of data and materials. Data available on request from the authors.

Competing interests: None

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Authors' contributions. KU and ML conceived the study. KU, MS, and ML designed the study. KU and MS collected and analyzed the data, and drafted the manuscript. All authors contributed in data interpretation and manuscript preparation.

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Tables

Due to technical limitations, the tables are only available as a download in the supplemental files section.

Figures

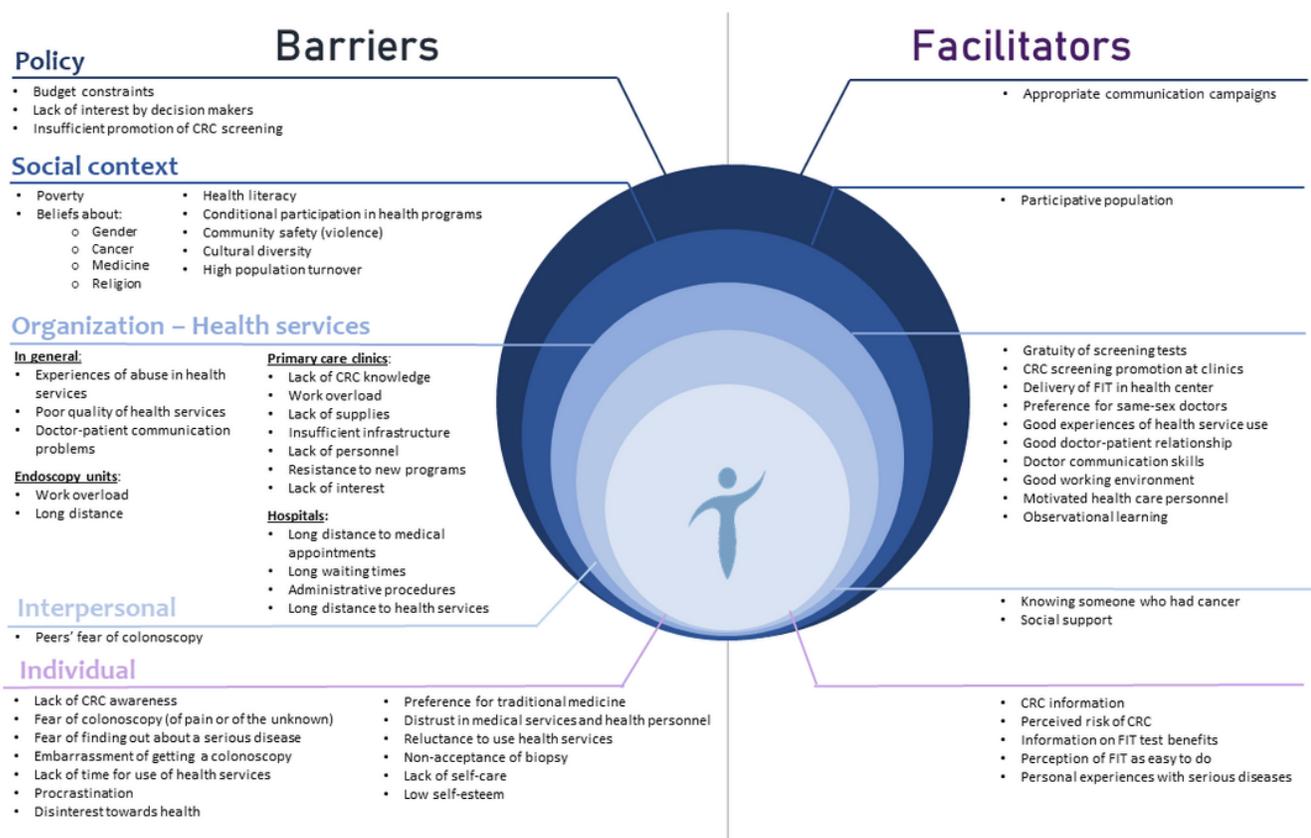


Figure 1

Social Ecological Model which summarizes our findings

Supplementary Files

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