

# EXPLORING THE BARRIERS TOWARD COLORECTAL CANCER SCREENING: A LITERATURE REVIEW

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## Abstract

**Background:** Colorectal cancer is the third most common cancer and the second leading cause of death worldwide. Bowel cancer screening helps prevent colon cancer by early detection of polyps, leading to efficient treatment and reduced mortality. Within Qatar, primary health facilities promote bowel screening by using the faecal occult blood test. However, the popularity and use of this test is still low.

**Aim:** The aim of this literature review is to explore barriers related to colorectal cancer bowel screening using the faecal occult blood test in primary health care settings to facilitate colorectal cancer screening in Qatar.

**Method:** Cronin's five step framework for literature reviews was utilized for this paper. This review included nine articles that were peer-reviewed and published between 2009 and 2019. The nine articles were appraised by using the Mixed Methods Appraisal Tool. This tool has separate criteria to assess the quality of the qualitative, quantitative, and mixed-method studies.

**Result:** Three main barriers to bowel cancer screening included knowledge deficit, personal beliefs and organizational barriers.

**Conclusion:** The main barriers are related to the patients' lack of knowledge and personal beliefs. Overcoming these barriers is essential to raising awareness about this issue among all nurses, physicians, and patients. It is necessary to involve stakeholders in order to mitigate barriers. Developing educational activities for healthcare professionals will provide information that they can share with patients to encourage screening and decrease the fear of the test. Developing a pamphlet to increase patient awareness will also encourage screening and work toward decreasing fear.

**Key words:** faecal occult blood test, faecal immunochemical test, barriers

## Introduction

Colorectal cancer (CRC) is considered the third most common type of cancer diagnosis and the second leading cause of death worldwide (Guo et al., 2020). The American Cancer Society (2017) stated that around 1 in 24 women (4.2%) and 1 in 22 men (4.6%) will be diagnosed with CRC in the USA. The American Cancer Society (2017) defines CRC as the division and growth of abnormal cells in the rectum or colon. CRC usually begins as a non-cancerous benign tumor known as an adenoma that develops in the colon or rectal inner lining and grows slowly during a period of 10 to 20 years (Goede et al., 2017). It is estimated that one-third to one-half of all individuals will ultimately develop one or more adenomas during their lifetime (Schreuders et al., 2016). In contrast, all adenomas have the potential to be converted to cancer when they become enlarged, while only less than 10% are expected to progress to cancer (American Cancer Society, 2017). The CRC cancer stages are generally considered from the time of diagnosis. For this reason, it is essential to have early detection and diagnosis to prevent its progression to cancer (Ramazani et al., 2020).

While the morbidity and mortality rates have decreased in the Western countries related to the effectiveness of screening programs there remains an increase in middle to high-income countries in South America, Eastern Europe, and Asia (Al-Dahshan et al., 2020). Wong (2015) stated that bowel cancer screening proved efficient to decrease the cancer mortality rate by 33%. However, without adequate uptake of bowel screening within these countries, the number of colon cancer cases is expected to increase to 2.2 million and result in 1.1 million deaths by 2030 (Al-Dahshan et al., 2020). According to Chiu et al. (2015), the mortality and morbidity rates of CRC have risen in the last decade especially in these Asia-Pacific regions. Thus, the purpose of this literature review is to identify the barriers related to the uptake of bowel screening in order to prevent colorectal cancer.

## Methods

Cronin et al.'s (2008) framework was used for this literature review. This framework consists of five steps which include determining a review topic, searching the literature, analyzing and synthesizing literature, writing the review including adding references (Cronin et al., 2008).

A literature search of the following databases was done: CINAHL, MEDLINE, and Academic Search Complete. The search terms included: barrier, fecal occult blood test, cancer screening, perception, FIT, gFOBT, FOBT, and beliefs. Boolean operators AND and OR were used to make this search more precise. A total of 432 articles were evaluated for inclusion in this literature review. The titles of these articles were reviewed based on both the inclusion and exclusion criteria. Inclusion criteria consisted of (a) primary studies published in English between 2009 and 2020 and (b) quantitative, qualitative, or mixed method studies, studies that focused primarily on the barriers to FOBT, gFOBT, and FIT screening among men and women from the ages of 50 to 75 years old. Exclusion criteria were (a) non-peer reviewed studies, (b)

studies that did not report the barriers to FOBT, gFOBT and FIT and focused only on colonoscopy (c) studies not published in English (d), studies published before 2009 (e), studies not conducted in primary care settings, and (f) studies that included people less than 50 years of age. The initial search resulted in 432 articles of which 289 remained after applying limiters. The remaining 289 were then screened for duplication which left 143 articles. After reviewing titles and abstracts, 87 remained for further assessment of inclusion and exclusion criteria. The remaining 87 articles were checked for eligibility and resulted in a further 38 studies being excluded. After full text review of the remaining 49 articles, 40 were excluded because they did not discuss the barriers specifically to FOBT, gFOBT and FIT. In all, a total of 9 articles were included in this review (see Figure 1).

## Findings

The nine retrieved studies published between the years 2009-2020 were primary studies that used three different approaches: quantitative, qualitative, and mixed methods. These studies focused on those articles that discussed the barrier of FOBT. These studies were conducted in different countries: United States (n = 2), United Kingdom (n = 2), France (n = 1), Turkey (n = 2), and Australia (n = 2). In all, there were five quantitative studies, three qualitative, and one mixed method study in this review. The three major themes that emerged were (a) knowledge deficits, (b) personal beliefs and attitudes, (c) and organizational barriers (see Figure 2).

Figure 1: Search Strategy

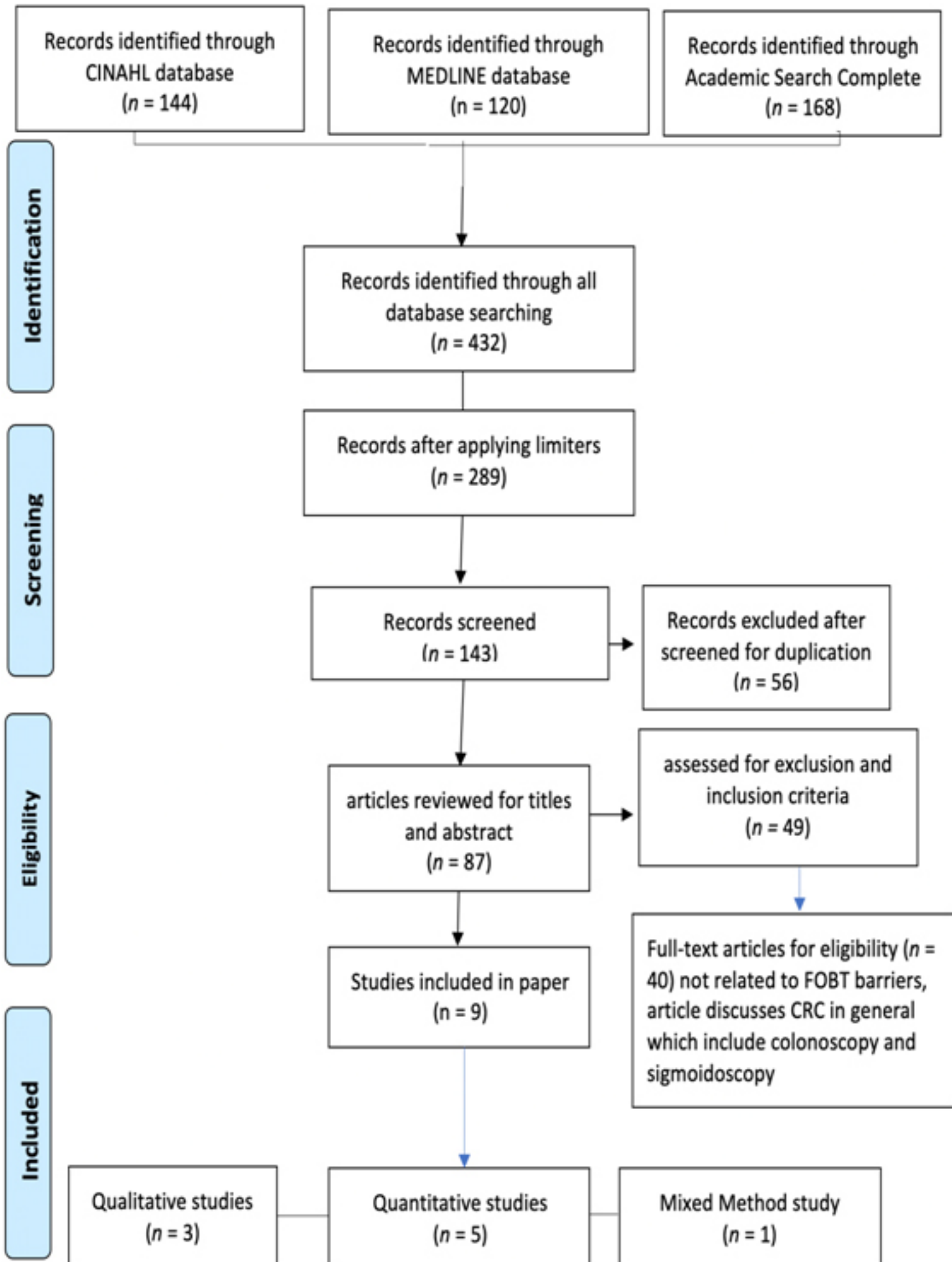
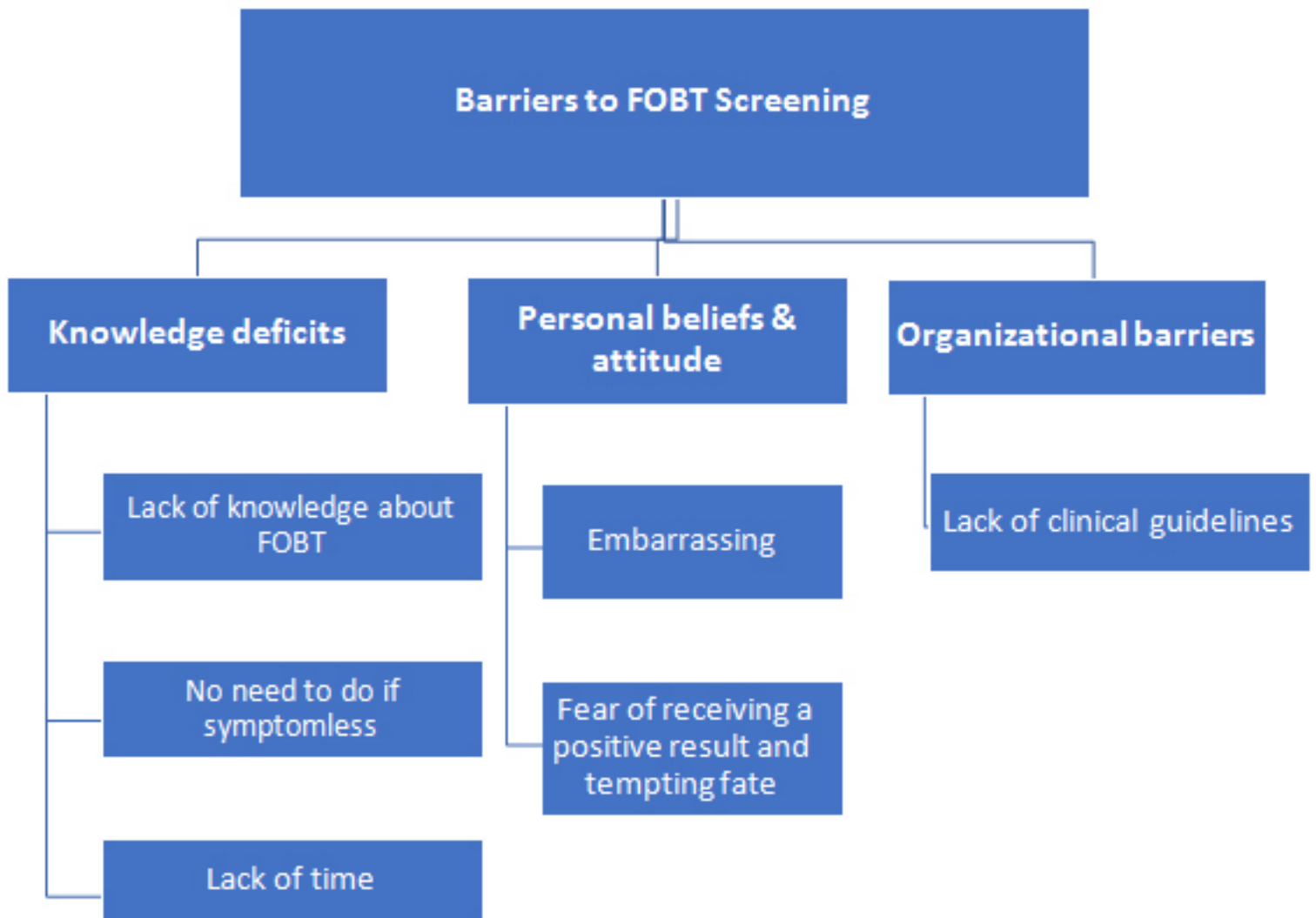


Figure 2: Identified Themes



## Discussion

In order to mitigate the rise seen in CRC cases in Qatar, it is essential to explore the barriers people have for not performing the available tests necessary to detect CRC. This literature review identified the barriers noted for the lack of uptake to CRC screening. These barriers were knowledge deficits, personal beliefs and attitudes, and organizational barriers.

### Knowledge Deficits.

#### Lack of Knowledge about FOBT

Knowledge plays an active and essential role in a patient's decisions, which affects the quality of life. This review highlighted the following barriers regarding knowledge deficits: lack of awareness regarding the importance of CRC screening, fear of receiving positive cancer result, absence of symptoms, and lack of time. Several studies have agreed that decreased awareness is a significant factor associated with CRC screening uptake. Saad et al. (2020) conducted a study in Dearborn, Michigan, to assess Arabic-speaking participants' knowledge of CRC. This study found that 70% of the participants lacked knowledge about colon polyps and over 89% were unaware that they are under high risk for CRC and need to do FOBT. This

study also agreed that insufficient knowledge about the importance of FOBT and the risk of CRC could be a barrier to FOBT. Congruent in this literature review was that lack of knowledge was significant in influencing people's decision to do the FOBT. Warner et al.'s (2018) study which aimed to assess knowledge, barriers, and feasibility of home-based FIT in a Latina's population for CRC screening found that 30% of participant did not know about CRC screening resulting in low compliance with FOBT.

#### No Need to do it if Symptomless

Colorectal cancer develops without early warning signs or symptoms which will affect people's decisions not to do the FOBT screening. A person may be reluctant to do the FOBT because they believe they do not have symptoms. Lack of symptoms leads people to not be concerned, which is considered as a barrier of CRC screening (Davis et al., 2016; Warner et al., 2018). The Cancer Council Australia population surveys showed that people of advanced age believed that screening was necessary only if they developed symptoms (as cited in Lotfi-Jam et al., 2019). In addition, Lee's (2018) study, which was done in Korea, aimed to understand the awareness of CRC screening in order to implement a strategy to improve it. Many participants in this study explained that FOBT was not a priority because they

assumed that the absence of symptoms meant that they are healthy. In Le Pimpec et al.'s (2017) study, they found 16% of participants felt non-concerned to do the test in absence of symptoms. This study also noted that lack of symptoms is one of the essential barriers of FOBT.

### **Lack of Time**

Lack of time was found as a barrier to doing the FOBT in this literature review.

Le Pimpec et al.'s (2017) study also found lack of time was frequently reported by participants. Also noted in their study was that 36% of participants age 55 to 75 years reported that they did not have time to do the test. Lack of time for FOBT was also a barrier of FOBT reported by Miranda-Diaz et al. (2015). These authors found that 17% of participants reported they did not have the time to do the FOBT for various reasons.

### **Personal Beliefs and Attitudes**

#### ***Embarrassing***

This review showed personal beliefs and attitudes affect people's decision not to do the FOBT. The most common personal belief was that of embarrassment toward collecting one's own stool sample. Congruent with the findings in Miranda-Diaz et al.'s (2015) study which looked at barriers of compliance to cancer screening among Hispanic patients, that participants were not only disgusted but embarrassed by collecting their own stool sample. In this study, 33% of participants did not have the FOBT because of feeling discomfort from doing the test. Similarly, in Davis et al.'s (2016) study, participants felt embarrassed from doing the FOBT; as one participant explained "giving stool-fecal sample for testing is really embarrassing" (p. 3). Lecky et al. (2014) did a qualitative study in the UK to examine patient's perception in providing a FOBT and found that participants felt disgusted and embarrassed by the contamination of their hands having to deal with feces. They felt disgusted while placing their hands near the toilet bowl to collect a stool sample. Congruent with the findings from this literature review, Javanparast et al. (2012) did a qualitative study to identify facilitators and barriers of CRC testing among different cultures in South Australia and one participant in this study stated "dealing with a dirty part of the body; it is why many people do not like to do it" (p. 552). In line with this literature review, another Asian study by Azeem et al. (2016) to assess the barriers of CRC screening in Asia stated that a feeling of embarrassment was a barrier to the uptake for the FOBT.

#### ***Fear of Receiving a Positive Result and Tempting Fate***

One of the barriers that affects the uptake of the FOBT is fear of receiving a positive result (Qumseya et al., 2014; Taskila et al., 2009; Yong et al., 2016). Davis et al.'s (2016) study conducted in Australia found that 11% of participants felt fear of receiving positive results and tempting fate. Thus, some people felt anxious when they received the FOBT kit because they thought they were a significant CRC risk. Beeker et al.'s (2000) study, which

looked at colorectal cancer screening in older men and women, also found that the biggest barrier to doing the FOBT was fear of receiving a positive result. In the same study, one participant described the CRC as "the disease no one wants to talk about" (p. 274). Javanparast et al. (2012) also explained that many people believe that disease, death, and life cannot be controlled because these are in God's hands. Noted in the literature was a study conducted by Taskila et al. (2009) which aimed to identify factors affecting CRC attitude. They found that some participants believe that they were tempting fate by undergoing FOBT.

### **Organizational Barriers**

#### ***Lack of Clinical Guidelines***

This literature review showed that general practitioner's recommendation for CRC screening is crucial to encourage patients to undergo FOBT. A lack of physician recommendation owing to an absence of clear clinical guidelines is a barrier to FOBT. This was found in Le Pimpec et al.'s (2017) study who recommended that physicians encourage patients to do bowel cancer screening because physicians can convince patients by explaining the importance of screening. A similar finding was found in Leung et al.'s (2016) quantitative study done in China to identify the factors that stop Chinese people from participating in CRC screening. This study found that physician recommendation was considered as the strongest factor associated with FOBT. In the same study, participants who did not receive advice or a recommendation from their physician were less likely to do the FOBT. In line with this literature review finding, GPs are not likely to advise patients to have the CRC screening due to lack of clinical guidelines (Nguyen et al., 2017; Sewitch et al., 2007; Wee et al., 2005;). Javanparast et al. (2012) stated that a trusting relationship between the physician and patient is considered essential in order to encourage and influence their decision regarding FOBT. As stated by a participant in their study, "if my doctor asked me to do it I will do it" (p. 522). A qualitative study that explored barriers and facilitators of CRC among Vietnamese people in the USA (Kimura et al. (2015) found that male and female participants mentioned that physician recommendations are essential facilitators to CRC screening.

An appropriate medical system with clear guidelines is required to increase the screening rate of FOBT. Lack of a supportive medical system will affect the medical team's ability to identify patients' need for screening and family history about CRC, follow up, and sending reminders. As explained in the study done in New Mexico by Hoffman et al. (2011), which explored the barriers to CRC screening, lack of electronic medical records and tracking systems was considered a significant barrier for FOBT. Yong et al (2016) also noted that 28.9% of participants did not do the FOBT because of a lack of a reminder. Thus, it is necessary to provide adequate guidelines for CRC screening to facilitate tracking and identification of patients who need FOBT screening.



## Implications and Recommendations

This literature review highlighted the barriers related to bowel screening such as the FOBT in order to detect colorectal cancer. One of the barriers at the organizational level necessitates clear policies within hospitals in order that physicians are all on the same page and recommending necessary screening with all eligible patients. The majority of the barriers were related to knowledge deficit and personal beliefs of the patients. Therefore, it is necessary to address these with patients in order to increase the uptake of bowel screening. In order to do this, it is necessary to raise awareness about this issue among all nurses and physicians and patients. Thus, a recommendation is to develop educational activities that include materials for both patients and healthcare personnel that will offer patients information that can allay those fears and healthcare personnel information they can share with patients.

## Strengths and Limitations

The strength is that all articles included were peer reviewed and published between 2009 and 2019. This review also includes a study that used mixed method paradigms that consider strength because both quantitative and qualitative data gives a comprehensive view of the barriers of FOBT. However, a limitation of this review is that most studies examined the barriers related to colonoscopy and sigmoidoscopy and not that of the FOBT.

## Conclusion

Bowel cancer screening is essential to discover colorectal cancer at an early stage.

Colorectal cancer is preventable if screened appropriately and on time. There are several barriers to colorectal cancer screening. Understanding barriers to FOBT is essential to overcome these barriers and increase screening rates to improve quality of life. Lack of knowledge was the most critical barrier linked to the majority of other barriers. These barriers could affect people from undergoing FOBT for early detection, prevention, and treatment of CRC. Health care providers play an essential role in encouraging patients to undergo screening by increasing awareness about the importance of FOBT. Also, the availability of appropriate medical systems is important for improving CRC screening rate. Therefore, colorectal cancer screening is a cost-effective and useful test for preventing and controlling colon cancer worldwide.

## References

Al-Dahshan, A., Chehab, M., Bala, M., Omer, M., AlMohamed, O., Al-Kubaisi, N., & Selim, N. (2020). Colorectal cancer awareness and its predictors among adults aged 50–74 years attending primary healthcare in the State of Qatar: A cross-sectional study. *BMJ Open*, 10(7), e035651. <https://doi.org/10.1136/bmjopen-2019-035651>

American Cancer Society. (2017). Colorectal cancer facts & figures 2017-2019. <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/colorectal-cancer-facts-and-figures/colorectal-cancer-facts-and-figures-2017-2019.pdf>

Azeem, E., Gillani, S. W., Poh, V., Sulaiman, S. A., & Baig, M. R. (2016). Barriers to colorectal cancer screening in Asia: A systematic review. *Tropical Journal of Pharmaceutical Research*, 15(7), 1543. <https://doi.org/10.4314/tjpr.v15i7.26>

Beeker, C., Kraft, J. M., Southwell, B. G., & Jorgensen, C. M. (2000). Colorectal Cancer Screening in Older Men and Women: Qualitative Research Findings and Implications for Intervention. *Journal of Community Health*, 25(3), 263-279. <https://link.springer.com/article/10.1023/A:1005104406934>

Chiu, H., Chen, S. L., Yen, A. M., Chiu, S. Y., Fann, J. C., Lee, Y., Pan, S., Wu, M., Liao, C., Chen, H., Koong, S., & Chiou, S. (2015). Effectiveness of fecal immunochemical testing in reducing colorectal cancer mortality from the one million Taiwanese screening program. *Cancer*, 121(18), 3221-3229. <https://doi.org/10.1002/cncr.29462>

Cronin, P., Ryan, F., & Coughlan, M. (2008). Undertaking a literature review: A step-by-step approach. *British Journal of Nursing*, 17(1), 38-43. <https://doi.org/10.12968/bjon.2008.17.1.28059>

Davis, M., Oaten, M., Occhipinti, S., Chambers, S. K., & Stevenson, R. J. (2016). An investigation of the emotion of disgust as an affective barrier to intention to screen for colorectal cancer. *European Journal of Cancer Care*, 26(4), e12582. <https://doi.org/10.1111/ecc.12582>

Goede, S. L., Rabeneck, L., Van Ballegooijen, M., Zauber, A. G., Paszat, L. F., Hoch, J. S., Yong, J. H., Kroep, S., Tinmouth, J., & Lansdorp-Vogelaar, I. (2017). Harms, benefits and costs of fecal immunochemical testing versus guaiac fecal occult blood testing for colorectal cancer screening. *PLOS ONE*, 12(3), e0172864. <https://doi.org/10.1371/journal.pone.0172864>

Guo, F., De Brabander, I., Francart, J., Candeur, M., Polus, M., Van Eycken, L., & Brenner, H. (2020). Benefits of switching from guaiac-based faecal occult blood to faecal immunochemical testing: Experience from the Wallonia–Brussels colorectal cancer screening programme. *British Journal of Cancer*, 122(7), 1109-1117. <https://doi.org/10.1038/s41416-020-0754-5>.

Hoffman, Richard M, Rhyne, Robert L, Helitzer, Deborah L, Stone, S Noell, Sussman, Andrew L, Bruggeman, Elizabeth E, Viera, Robyn, & Warner, Teddy D. (2011). Barriers to colorectal cancer screening: physician and general population perspectives, New Mexico, 2006. *Preventing Chronic Disease*, 8(2), A35–A35. [https://www.cdc.gov/Pcd/issues/2011/mar/pdf/10\\_0081.pdf](https://www.cdc.gov/Pcd/issues/2011/mar/pdf/10_0081.pdf)

Javanparast, S., Ward, P. R., Carter, S. M., & Wilson, C. J. (2012). Barriers to and facilitators of colorectal cancer screening in different population subgroups in Adelaide, South Australia. *Medical Journal of Australia*, 196(8), 521-523. <https://doi.org/10.5694/mja11.10701>

- Javanparast, S., Ward, P. R., Carter, S. M., & Wilson, C. J. (2012). Barriers to and facilitators of colorectal cancer screening in different population subgroups in Adelaide, South Australia. *Medical Journal of Australia*, 196(8), 521-523. <https://doi.org/10.5694/mja11.10701>
- Kimura, A., Sin, M., Spigner, C., Tran, A., & Tu, S. (2014). Barriers and facilitators to colorectal cancer screening in Vietnamese Americans: A qualitative analysis. *Journal of Cancer Education*, 29(4), 728-734. <https://doi.org/10.1007/s13187-014-0646-6>
- Le Pimpec, F., Moutel, G., Piette, C., Lièvre, A., & Bretagne, J. (2017). Fecal immunological blood test is more appealing than the guaiac-based test for colorectal cancer screening. *Digestive and Liver Disease*, 49(11), 1267-1272. <https://doi.org/10.1016/j.dld.2017.08.018>
- Lecky, D. M., Hawking, M. K., & McNulty, C. A. (2014). Patients' perspectives on providing a stool sample to their GP: A qualitative study. *British Journal of General Practice*, 64(628), e684-e693. <https://doi.org/10.3399/bjgp14x682261>
- Lee, S., & Miller, A. (2018). Factors influencing participation in fecal occult blood testing to screen for colorectal cancer in Australia. *JBI Database of Systematic Reviews and Implementation Reports*, 16(1), 57-62. <https://doi.org/10.1124/jbisrir-2017-003392>
- Leung, D., Chow, K., Lo, S., So, W., & Chan, C. (2016). Contributing factors to colorectal cancer screening among Chinese people: A review of quantitative studies. *International Journal of Environmental Research and Public Health*, 13(5), 506. <https://doi.org/10.3390/ijerph13050506>
- Lotfi-Jam, K., O'Reilly, C., Feng, C., Wakefield, M., Durkin, S., & Broun, K. (2019). Increasing bowel cancer screening participation: Integrating population-wide, primary care and more targeted approaches. *Public Health Research & Practice*, 29(2), 1-6. <https://doi.org/10.17061/phrp2921916>
- Miranda-Diaz, C., Betancourt, E., Ruiz-Candelaria, Y., & Hunter-Mellado, R. (2015). Barriers for compliance to breast, colorectal, and cervical screening cancer tests among Hispanic patients. *International Journal of Environmental Research and Public Health*, 13(1), 21. <https://doi.org/10.3390/ijerph13010021>
- Nguyen-Oghalai, T., & Wu, Z. H. (2009). Factors associated with a physician's recommendation for colorectal cancer testing in a diverse population. *Family Medicine*, 41(6), 427-433. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2743547/pdf/nihms-123513.pdf>
- Qumseya, B. J., Tayem, Y. I., Dasa, O. Y., Nahhal, K. W., Abu-Limon, I. M., Hmidat, A. M., Al-Shareif, A. F., Hamadneh, M. K., Riegert-Johnson, D. L., & Wallace, M. B. (2014). Barriers to colorectal cancer screening in Palestine: A national study in a medically underserved population. *Clinical Gastroenterology and Hepatology*, 12(3), 463-469. <https://doi.org/10.1016/j.cgh.2013.08.051>
- Ramazani, A. A., Norozi, E., AmirabadiZadeh, H., Ehteshampour, A. R., & Salehiniya, H. (2020). Predictors of colorectal cancer screening participation in southern Khorasan (Iran). *Journal of Gastrointestinal Cancer*. <https://doi.org/10.1007/s12029-020-00379-y>
- Saad, F., Ayyash, M., Ayyash, M., Elhage, N., Ali, I., Makki, M., Hamade, H., & Blackwood, R. A. (2020). Assessing knowledge, physician interactions and patient-reported barriers to colorectal cancer screening among Arab Americans in Dearborn, Michigan. *Journal of Community Health*, 45(5), 900-909. <https://doi.org/10.1007/s10900-020-00807-x>
- Schreuders, E. H., Grobbee, E. J., Spaander, M. C., & Kuipers, E. J. (2016). Advances in fecal tests for colorectal cancer screening. *Current Treatment Options in Gastroenterology*, 14(1), 152-162. <https://doi.org/10.1007/s11938-016-0076-0>
- Sewitch, M. J., Fournier, C., Dawes, M., Yaffe, M., Snell, L., Roper, M., Zanelli, P., & Pavilanis, A. (2007). Do physician recommendations for colorectal cancer screening differ by patient age? *Canadian Journal of Gastroenterology*, 21(7), 435-438. <https://doi.org/10.1155/2007/938978>
- Taskila, T., Wilson, S., Damery, S., Roalfe, A., Redman, V., Ismail, T., & Hobbs, R. (2009). Factors affecting attitudes toward colorectal cancer screening in the primary care population. *British Journal of Cancer*, 101(2), 250-255. <https://doi.org/10.1038/sj.bjc.6605130>
- Warner, E. L., Bodson, J., Mooney, R., Lai, D., Samadder, N. J., & Kepka, D. (2017). Latinas' colorectal cancer screening knowledge, barriers to receipt, and feasibility of home-based fecal immunochemical testing. *Journal of Immigrant and Minority Health*, 20(4), 981-990. <https://doi.org/10.1007/s10903-017-0615-3>
- Wee, C. C., McCarthy, E. P., & Phillips, R. S. (2005). Factors associated with colon cancer screening: The role of patient factors and physician counseling. *Preventive Medicine*, 41(1), 23-29. <https://doi.org/10.1016/j.ypmed.2004.11.004>
- Wong, M. C., Ching, J. Y., Chan, V. C., Lam, T. Y., Luk, A. K., Ng, S. S., & Sung, J. J. (2015). Factors associated with false-positive and false-negative fecal immunochemical test results for colorectal cancer screening. *Gastrointestinal Endoscopy*, 81(3), 596-607. <https://doi.org/10.1016/j.gie.2014.08.006>
- Yong, S. K., Ong, W. S., Koh, G. C., Yeo, R. M., & Ha, T. C. (2016). Colorectal cancer screening: Barriers to the faecal occult blood test (FOBT) and colonoscopy in Singapore. *Proceedings of Singapore Healthcare*, 25(4), 207-214. <https://doi.org/10.1177/2010105816643554>

## Appendix A: Data Extraction Matrix for Articles

Author and Country	Methods	Barriers
Sahin et al., (2016) Barriers to Colorectal Cancer Screening as perceived by PHCP in Turkey	Quantitative N= 478 primary health care providers (physicians and family health personal 1. Questionnaire developed for study, three main sections (socio-demographics, knowledge attitudes and practices, and 3) barriers 2. Data transfer onto SPSS 22.0 and analyzed as percentage and numbers.	<ul style="list-style-type: none"> <li>• Fear of bad test results</li> <li>• Embarrassing</li> <li>• Hearing unpleasant things about the test from others</li> <li>• Healthcare provider not recommending the test</li> </ul>
Smith et al., (2016) Barriers and facilitators to FOBT screening UK	<ol style="list-style-type: none"> <li>1. Quantitative</li> <li>2. N= 8576, age range 45 to 59.5 years of age. The majority were married, white, employed, good level of self-reported health 54.2% had high school, 32.1% university.</li> <li>3. Questionnaire – (five questions assessed barriers to FOBT)</li> <li>4. Descriptive and logistic regression</li> </ol>	<ul style="list-style-type: none"> <li>• Doing a FOBT would be disgusting, (16.6%)</li> <li>• Embarrassed if others knew I had done the FOBT (6.9%)</li> <li>• Doing a FOBT would make me worry about bowel cancer (16.8%)</li> <li>• Afraid of getting an abnormal result (56.6%)</li> <li>• Patient would not want to keep stool sample in the house,</li> <li>• No privacy to do FOBT test,</li> <li>• No time to do the test</li> </ul>
Broc et al., (2017) Motivational process underlying decision-making in FOBT participation France	<ol style="list-style-type: none"> <li>1. Mixed method</li> <li>2. 5894 (men &amp; women) Female N= 3401 (57.7%) age 50-74. Mean age 60 yrs. (SD=6.9).</li> <li>3. Telephone survey, three nurses, and one psychologist conducted semi-structured interviews.</li> <li>4. Used a similarity tree (facilitates capture of barriers and motivation to screening)</li> </ol>	<ul style="list-style-type: none"> <li>• Previous screening, no cancer consultation fees</li> <li>• "No time"</li> <li>• Healthy life (no symptoms)</li> <li>• Not concerned (too young/old)</li> <li>• Afraid, Family pressure</li> <li>• Discourage by GP</li> </ul>
Green et al., (2017) Barriers and facilitators reported by patients with suboptimal screening adherence to refine interventions of starting ongoing adherence to CRC screening USA	<ol style="list-style-type: none"> <li>1. Qualitative</li> <li>2. Purposive sampling- N= 41; (44%) male &amp; (30%) female (wrong number 44 plus 0 = 74 need 100% age ranged 50-73 years; 23 completed 1 FOBT and 18 did not during the three-year study despite reminders</li> <li>3. Phone interview, audio-recorded</li> <li>4. Thematic analysis</li> </ol>	<ul style="list-style-type: none"> <li>• "Avoidance" (i.e. not paying attention, remembering, taking time for test, or procrastinating.)</li> <li>• "Fear" (i.e. fear of cancer diagnosis and fear in general).</li> <li>• "Test specific barriers (i.e. Handling the stool)</li> <li>• "Health concerns" for example a "never" screener listed multiple health conditions and the need to prioritize. Other participants mentioned the same. Also, health concerns about medication</li> </ul>



## Appendix A: Data Extraction Matrix for Articles (continued)

<p>Dharni et al., (2016) Factors affecting CRC screening in socio-economically and ethnically diverse inner-city population UK</p>	<ol style="list-style-type: none"> <li>1. Qualitative study, guided by the Theoretical Domains Framework</li> <li>2. Purposive 50 participants, 29 males; 21 female, age range 55-75 years of age, 21 SES 34% low, 44% intermediate &amp; 20% high 13 Black African, 15 black Caribbean, 17 white British (n=17) and 2 black others and 3 white others.</li> <li>3. Face to face interviews, recorded</li> <li>4. Framework analysis.</li> </ol>	<p>Result: lack of awareness of CRC was barrier of screening, the majority of participants reported they knew very little about CRC.</p> <ul style="list-style-type: none"> <li>• Lack of awareness</li> <li>• Fear of cancer /screening outcome</li> <li>• Faith in God</li> <li>• Misunderstanding instruction for completing FOBT</li> <li>• Collecting fecal sample (hygiene and potential smell)</li> <li>• Existing physical /mental health issues,</li> <li>• Being too busy or stressed at work &amp; having to care for elderly person,</li> <li>• Mobility or physical limitations.</li> <li>• Different ethnic groups may have different beliefs about health, illness &amp; prevention</li> </ul>
<p>Bulduk et al., (2017) Colorectal Cancer risks of individuals aged over 50 and their attitudes towards having FOBT Turkey</p>	<ol style="list-style-type: none"> <li>1. Quantitative, descriptive, cross-sectional</li> <li>2. N= 1500, mean age 64.4 yrs.</li> <li>3. Survey using Scale for Assessment of Benefits and Barriers of Colorectal Cancer Screening-FOBT. 8 items related to barriers.</li> </ol>	<ul style="list-style-type: none"> <li>• Doing a FOBT is unpleasant</li> <li>• Don't know how to do test</li> <li>• Embarrassing</li> <li>• No problems</li> <li>• Afraid of results</li> <li>• Cost, no health insurance.</li> <li>• No Time</li> <li>• No privacy to do test</li> </ul>
<p>Dawson et al., (2016) To understand the factors that influence personal behavior of uptake of the bowel screening: A health belief model used to guide study. Australia</p>	<ol style="list-style-type: none"> <li>1. Qualitative</li> <li>2. Purposive sample, N=61 age 45-69 yrs.</li> <li>3. Seven focus group</li> <li>4. Thematic analysis</li> </ol>	<p>Six main themes emerged</p> <ul style="list-style-type: none"> <li>• Health awareness and its influence on health behaviors (fatalism) may manifest itself as denial &amp; avoidance of health care system.</li> <li>• Conceptualizing the risk of bowel cancer:</li> <li>• Awareness of screening</li> <li>• Perceived value of screening</li> <li>• Motivators and barriers to FOBT</li> <li>• Knowledge &amp; its impact on intentions to screen.</li> </ul>
<p>Davis et al., (2013) The differences in CRC screening knowledge, beliefs, barriers &amp; health system experiences among rural &amp; urban patients who were not up-to-date with CRC screening USA</p>	<ol style="list-style-type: none"> <li>1. Quantitative</li> <li>2. Interview, survey administered orally.</li> </ol> <p>N= 972 Age 50 to 70 Descriptive &amp; logistic regression</p>	<ul style="list-style-type: none"> <li>• Afraid the FOBT instructions will be confusing</li> <li>• Doing FOBT is embarrassing</li> <li>• Doing an FOBT is a lot of trouble.</li> <li>• Doing an FOBT is messy.</li> <li>• Lack of time</li> <li>• Cost and low income, lack of interest of screening</li> <li>• Worried from bad result</li> </ul>

## Appendix A: Data Extraction Matrix for Articles (continued)

<p>Todorov et al., (2018)</p> <p>To examine knowledge, and reasons for use or non-use (FOBT) for colorectal cancer (CRC)</p> <p>Australia</p>	<ol style="list-style-type: none"> <li>1. Quantitative</li> <li>2. Questionnaire survey years 2011, 2012, and 2014</li> <li>3. N= 2732</li> <li>4. 4. 51.8% Men &amp; 48.2 women 50–75 years</li> <li>5. Logistic regression analysis</li> </ol>	<ul style="list-style-type: none"> <li>• Reasons given for non -use of FOBT</li> <li>• Had no symptoms</li> <li>• Lack of physician recommendation</li> <li>• Too busy or lack of time</li> <li>• Did not know that that this should be done every two years</li> <li>• Not interested and can't be bothered</li> <li>• Not aware about the FOBT</li> <li>• No family history of bowel cancer</li> <li>• Too embarrassed to do the test</li> <li>• Have other bowel examinations</li> <li>• Have regular colonoscopies</li> </ul>
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