Review Article

Gastrointestinal Cancer Prevention Policies: A Qualitative Systematic Review and Meta-Synthesis

Abstract

This qualitative systematic review was conducted to summarize the policies for prevention of common gastrointestinal cancers worldwide. This study was conducted using PubMed, Web of Science, SCOPUS, and ProQuest databases. Two independent reviewers assessed included studies for methodological quality and extracted data by using standardized tools from Joanna Briggs Institute (JBI). Primary study findings were read and reread to identify the strategies or policies used in the studies for prevention of gastrointestinal cancers. The extracted findings were categorized on the basis of their similarity in meaning. These categories were then subjected to a meta-synthesis. The final synthesized findings were graded according to the ConQual approach for establishing confidence in the output of qualitative research synthesis. From the nine included studies in this review, 39 findings were extracted and based on their relevance in meaning were aggregated into 12 categories. Four synthesized findings were developed from these categories. We used World Health Organization report on 2000 for synthesizing the findings. The four synthesized findings were "service provision", "resource generation", "financing", and "stewardship". In order to reach a comprehensive evidence informed policy package for the prevention of gastrointestinal cancers, there should be a great communication among the interventions conducted directly on patients, health system infrastructures, and resources.

Keywords: *Gastrointestinal cancer, policy, primary prevention, secondary prevention, strategy*

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Introduction

Non-Communicable Diseases (NCDs) are of the biggest threats to health and human development worldwide, particularly in developing countries. Seven in 10 people die from one of the four major types of NCDs including cardiovascular disease, cancers, diabetes, and chronic pulmonary diseases.[1] Results of a study showed that the global incidence and mortality of all cancer types among young adults aging 20-39 in 2012 was 43.3 and 15.9 per 100000 people per year, respectively.[2]

Based on the results of a study, liver and stomach cancers are predicted to be two of the first five causes of death.[3] Further, findings from a review study showed that the burden of gastrointestinal cancers, especially the five most common cancers of this system, including stomach, colon, liver, pancreas, and esophagus has an increasing trend in Asia.[4] In a recent study conducted by Darabi and colleagues in 2016 it was reported that the incidence rate of gastrointestinal cancers has steadily increased over the past 10 years.[5]

It has been reported that cancer incidence can be controlled and reduced by prevention, screening, and finally with a timely and effective cure.[6] According to the results of a systematic analysis of global burden of disease published in a study, it is expected that the incidence of cancer increase in the future; hence, it will be better to allocate some limited sources to prevention and early diagnosis of cancers.[7]

National and international policies and strategies that provide NCDs with high quality preventive and curative care on the whole and specifically to each of four major types of NCDs can be helpful for health policy makers and health care providers.[8,9] In this regard, World Health Organization (WHO) and United Nations general assembly have developed global action plans for the prevention of NCDs.[10,11]

For example, in Iran there are some policies other than national action plan for prevention of NCDs,[12] such as nutritional traffic light labeling and taxation on

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unhealthy food products for the prevention of NCDs in Iran.[13] Also, African countries have developed policies for controlling risk factors of NCDs.[14] For example, in Zambia the government has made the policy response and developed a strategic plan for controlling NCDs.[15]

Despite many international and national policies and strategic plans for the prevention of NCDs and gastrointestinal cancers, there has not yet been a comprehensive qualitative systematic review in this context. As it is mentioned in a study, there is a strong need for producing evidence informed policies for the prevention of NCDs.[16] Hence, we conducted the current systematic review to summarize policies for the prevention of common gastrointestinal cancers worldwide. Based on the context of their country, health policy makers could rely on the results of this review in a way to implement the synthesized findings.

Methods

Inclusion criteria

Types of participants

This qualitative review considered studies that included patients of any age, gender, and cultural background that have been prevented from a common gastrointestinal cancer. Also, the studies that included physicians and all health services providers, managers, and policy makers from a variety of cultural background, which provided or decided interventions for the prevention of gastrointestinal cancers, were included.

Phenomena of interest

The current systematic review considered the studies that described policies and strategies for the prevention of common gastrointestinal cancers. Any type of policies reported in the studies; such as strategies, action plans, and rules, were considered and included.

Context

Qualitative studies conducted in health care and community settings all over the world were included.

Types of studies

Current review considered qualitative studies with all methodologies that include but are not limited to designs such as phenomenology, ethnography, case studies, grounded theory, and qualitative components of mixed method studies.

Search strategy

The search strategy aimed to consider both published and unpublished studies. A preliminary limited search of MEDLINE was undertaken to find MeSH terms and text words in order to develop a search strategy. All the identified keywords and MeSH terms were searched across all the included databases. Furthermore, the reference list of all the included studies was screened for any additional research.

This review was limited to the studies published in English due to inability to translate the studies having been published in other languages. As the first integrated program of WHO to prevent and control non-communicable diseases was published in 1988, the search strategy was limited to the studies published between January 1988 to 30 Juan 2018.

Information sources

The databases searched were PubMed, ISI Web of Knowledge, SCOPUS, The Cochrane Library, JBI database of systematic reviews and implementation reports, and ProQuest dissertations, and theses. Also, the following databases were searched for any qualitative report: WHO, United Nations, and World Bank. A full search strategy is provided in Appendix 1.

Study selection

Following the search, all the identified citations were collated and uploaded into Endnote software and then the duplicates were removed. The titles and abstracts were then screened by two independent reviewers for assessment against the inclusion criteria for the review. The studies that met the inclusion criteria were retrieved in full and assessed in detail against the inclusion criteria. The included studies underwent a process of critical appraisal. Any disagreements between the reviewers were resolved through discussion, and if it didn't help, a third reviewer independently appraised the paper.

Assessment of methodological quality

Each eligible study was assessed for methodological quality by two independent reviewers using Critical Appraisal Checklist for Qualitative Research from JBI.[17] Any disagreements between the reviewers were resolved through discussion, and if it didn't help, they were referred to the third reviewer. The reviewers considered the papers with a score of 7 and above as a high-quality paper.

Data extraction

Data were extracted from the included papers using the standardized data extraction tool from JBI.[17] Based on this tool, the extracted data included phenomena of interest, research methodology, context of the study (clinical, cultural, and geographical), participants, and study methods.

Data synthesis

The primary study findings were read and reread to identify the strategies or policies used in the studies for prevention of gastrointestinal cancers. These findings were grouped on the basis of their similarity in meaning. Categories were developed by the chief reviewer and were verified and

accepted by all the reviewers. These categories were then subjected to a meta-synthesis in order to produce a single comprehensive set of synthesized findings that could be used as a basis for evidence-based practice.

Assessing certainty in the findings

The final synthesized findings were graded according to the ConQual approach[18] for establishing confidence in the output of qualitative research synthesis. In ConQual approach, each paper is initially ranked as "high" if it is a qualitative paper. From this starting point, each paper is then graded for "dependability", and then "credibility". The dependability score is based on the scores of five questions (2, 3, 4, 6, and 7) from the critical appraisal checklist.[17] The ranking per paper moves up or down (or stays the same) depending on the "dependability" score as follows:

4-5 "yes" responses: the paper remains unchanged (high)
2-3 yes' responses: downgrade from high to moderate
0-1 yes' responses: downgrade from high to low, or moderate to very low.

The synthesized findings may then be downgraded based on the aggregate level of dependability from across the included findings. For example, if the majority of individual findings have a "low" level of dependability, this designation should then apply to the resultant synthesized findings.

The credibility score is assigned to each synthesized findings by crosschecking how many findings of what type included in the categories associate with the synthesized findings:

- Unequivocal (U): relates to evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported/observed and not open to challenge
- Credible (C): those that are, albeit interpretations, plausible in light of data and theoretical framework. They can be logically inferred from the data because the findings are interpretive they can be challenged
- Un-Supported (US): when neither 1 nor 2 applys and when most notable findings are not supported by the data.

Then, each synthesized finding was ranked according to the following scoring rubric:

- All unequivocal findings: remains unchanged
- Mix of unequivocal/credible findings: downgraded one (-1)
- Credible/unsupported findings: downgraded three (-3)
- Not-supported findings: downgrade four (-4).

The final ConQual score was then determined due to the levels of dependability and credibility.

Results

Study inclusion

In total, 9660 studies from PubMed, SCOPUS, Web of Science, JBI database of systematic reviews and implementation reports, The Cochrane Library, and ProQuest; 1592 database sources from WHO, United Nations, and World Bank; and 132 records form hand search of selected journals were identified using the search strategy. After removing duplicates using bibliographic software (EndNote), 9355 records remained. Title and abstract screening reduced this record to 63. Finally, nine articles were included in the review based on inclusion/exclusion criteria and methodological quality assessment. After full-text review, the most common reasons for exclusion were: (1) the research question didn't meet the aim of systematic review; (2) the research didn't have a qualitative methodology. Figure 1 is a PRISMA flow diagram of the study selection and inclusion process.

Characteristics of the included studies

The included studies provided qualitative data on the interventions and policies undertaken to prevent gastrointestinal cancers all over the world. The studies included in this review were published during the period 2004-2017. One of the nine included studies was a mixed method research with the descriptive methodology in the qualitative part.[19] One other study was part of a larger governmental study which was pragmatic and not underpinned by an exact methodology.[20] The other seven studies didn't state the specific qualitative methodology used in the research.[21-27] One of the included studies explored interventions of controlling liver cancer[21]; while, the others assessed colorectal cancer.[19,20,22-27] Five out of nine studies assessed attitudes of health care providers,[19-21,26,27] three studies surveyed patient's viewpoints,[22,23,25] and one study considered both consumers and health care providers.[24] A total of 150 health care providers and 121 patients and health services consumers participated in the eight included studies.[19-26] The number of participants in one study was unclear.[27] One of the nine studies was conducted internationally in 11 countries of Australia, China, France, Germany, Italy, Japan, Spain, South Korea, Taiwan, Turkey, and the United States,[21] two of the included studies were conducted in USA,[25,26] two in Canada,[19,24] two in Australia,[20,22] one in England,[23] and one was unclear.[27] The full characteristics of the included studies are indicated in Appendix 2.

Methodological quality

Among nine selected studies, three scored 9 out of 10,[20,25,26] four scored 8 out of 10,[21-24] and the remaining scored 7.[19,27] Table 1 summarizes the methodological quality of all the nine studies. Criteria 1, 2, 4, 5, 8, and 10, which are related to the congruity between research methodology and philosophical perspective, research objectives, representation and the analysis of data, interpretation of results, as well as representation of participant's voices and the congruity between conclusion and analysis of data, were met by all the included studies. Any of the included studies addressed the statement locating the researcher culturally or theoretically, criteria 6.

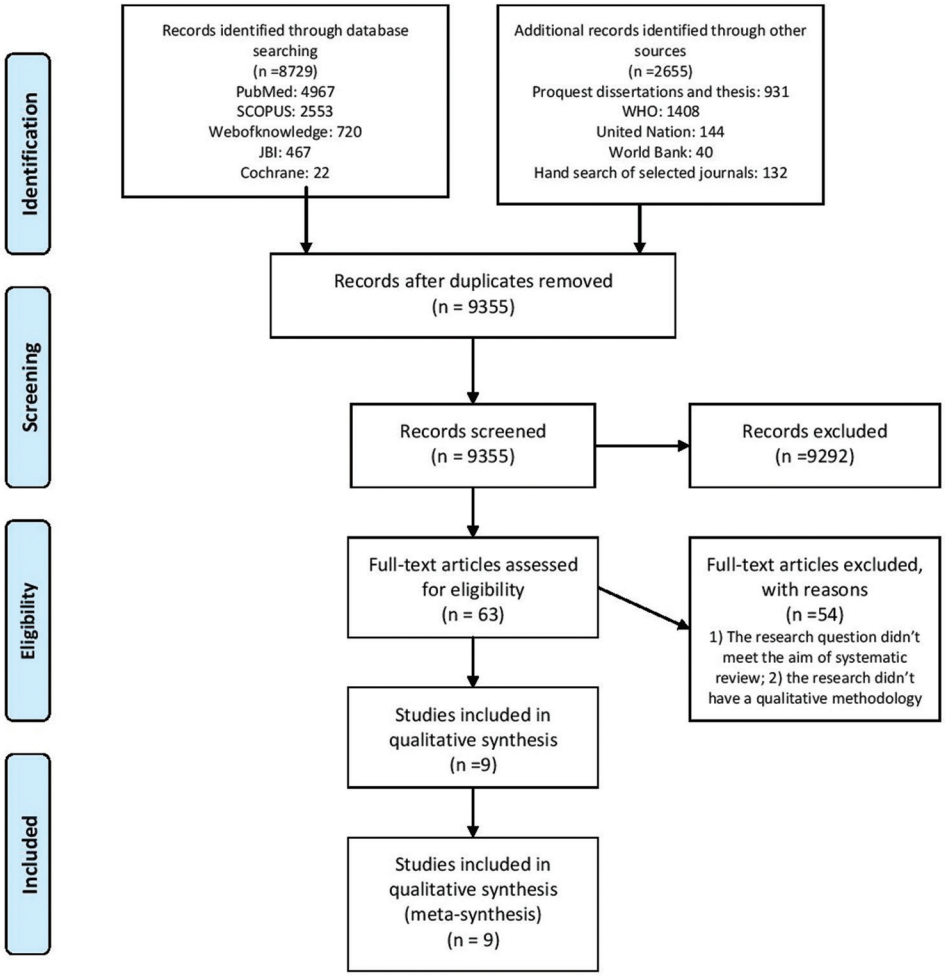

Figure 1: Search results and study selection and inclusion process

Review findings

From the nine included studies in this review, 39 findings were extracted and based on their relevance were aggregated into 12 categories. Four synthesized findings were developed from these categories. Level of credibility was allocated to each extracted finding to indicate the level of support as below: Unequivocal [U], Credible [C] and Unsupported [US]. Thirty-seven out of 39 findings were considered to be "Unequivocal" evidence; while the remaining two were assigned as "Unsupported". The extracted findings for the included studies and their supported illustrations are indicated in Appendix 3. All the illustrations are referenced to the page of the article, from which they were extracted.

The framework we used for synthesizing the findings was the WHO report on 2000,[28] in which the functions of health systems were categorized into four categories. These four synthesized findings were: "service provision", "resource generation", "financing", and "stewardship". Appendix 4 shows full overview of the findings linked to the categories and synthesized findings; while a brief description of each synthesized finding is reported below:

Synthesized finding 1: Service provision

This synthesized finding was developed from the aggregation of six categories and 27 findings. This synthesized finding implies the policies and interventions which deal with the service provision of the population. The interventions of primary and secondary preventions are included in this synthesized finding.

The first category "managing risk factors of the population" is developed from five findings: "Prevention of viral hepatitis (B and C) mostly through vaccination", "early risk assessment for Hepatocellular Carcinoma (HCC)", "Modification of risk factors such as alcohol use, obesity and diabetes for HCC", "Physical activity for intermediate or high risk colorectal adenoma", and "Consumption of red meat for intermediate or high risk colorectal adenoma". The findings of this category are the interventions and policies considering primary phase of prevention.

The second category "clinical methods of population screening" is developed from five findings: "Fecal occult blood testing (FOBT)", "colonoscopy", and "sigmoidoscopy". Both FOBT and sigmoidoscopy were

Table 1: Assessment of methodological quality of included studies

Criteria/Studies	Bridges	Jilcott Pitts	Buchman	Clavarino	Dowson	Dowswell	Goel	Liles	Sarfaty
Congruity between the stated philosophical perspective and the research methodology	Y	Y	Y	Y	Y	Y	Y	Y	Y
Congruity between the research methodology and the research objectives	Y	Y	Y	Y	Y	Y	Y	Y	Y
Congruity between the research methodology and the methods used to collect the data	Y	Y	N	Y	Y	Y	Y	Y	Y
Congruity between the research methodology and the representation and analysis of data	Y	Y	Y	Y	Y	Y	Y	Y	Y
Congruity between the research methodology and the interpretation of results	Y	Y	Y	Y	Y	Y	Y	Y	Y
Statement locating the researcher culturally or theoretically	N	N	N	N	N	N	N	N	N
The influence of the researcher on the research, and vice-versa, is addressed	U	Y	U	U	Y	U	U	Y	U
Participants, and their voices, are represented adequately	Y	Y	Y	Y	Y	Y	Y	Y	Y
Research is ethical	Y	Y	Y	Y	Y	Y	Y	Y	U
Conclusions appear to flow from the analysis or interpretation of the data	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total	8	9	7	8	9	8	8	9	7

Y: Yes, N: No, U: Unclear

repeated in two different studies, with no illustration addressed for sigmoidoscopy.

The third category "enhancing knowledge of population" is derived from five findings: "Increasing public awareness about importance of HCC through education by health campaigns and media exposure", "Public education about screening", "Use of support staff (medical assistants) trained in educating and motivating patients on screening and follow-up", "Self-care and community resources for colorectal cancer (CRC)", and "Providing follow-up information for screening results as needed". The findings of this category focus on enabling the population about the importance of prevention in gastrointestinal cancers and also follow-up services.

The forth category "Population management" is developed from three findings: "Identify and manage populations for CRC", "Screening of population at a certain age", and "Importance of targeting the asymptomatic population". This category focuses on the identification and screening of certain population.

The fifth category "Care management" is derived from three findings: "Plan and manage care for CRC", "Track and coordinate care: referral tracking for CRC", and "Measure and improve performance: implement continuous quality improvement for CRC". As it is seen, all of the findings in this category consider colorectal cancer. These findings focus on the aspects of provided care.

The sixth category "Increasing access to care" is derived from six findings of "Free colorectal cancer screening tests", "Building walk-in clinics", "Distribution of the FOBT kit by mail for colorectal screening", "Socioeconomic differences among patients", "Need to make CRC screening a self-referral program, similar to other screening programs (e.g., breast cancer screening)", and "Referral process for a screening colonoscopy involves multiple steps and departments, which sometimes creates miscommunication and lack of follow-up". The main focus of this category is on providing prevention services in a way that improve access of population, especially people living on the edge with low socioeconomic features. Also, removing obstacles, which may prevent people from getting services including bureaucracy and long distance, are the issues of interest for this category.

Synthesized finding 2: Resource generation

This synthesized finding was aggregated form four categories and nine findings and summarizes the interventions for creating and improving resources.

The first category "Guideline development" consists of two findings: "Developing mandatory screening guidelines and systems for HCC", and "Too many options in the system for screening and no clear guidelines for providers or patients".

The second category "Enhancing provider ability" is developed from two findings of "Education and communication about resource stewardship and evidence based outcomes as it pertains to CRC screening seen as helpful", and "Enhance access and communication between team". In this category, improving some skills is focused for care providers.

The third category "Enhancing knowledge among providers" is composed of three findings: "Educating primary care physicians about importance of liver disease and related risk factors", "Increasing political (government) awareness", and "Improving awareness among policy makers about importance of HCC".

The fourth category "Use of technology" is developed from two findings of "Access and utilization to electronic medical record tools that help identify screening gap or indicate prior completed screening", and "Use of automated telephone outreach for CRC screening". This category focuses on the use of technology as a tool to motivate people in order to use screening services for gastrointestinal cancers.

Synthesized finding 3: Financing

This synthesized finding is composed of one category and two findings. In this synthesized finding, the interventions of financing preventive services is provided.

The category "Financial support" is derived from two findings of "Improving surveillance of incidence, prevalence, and burden of liver cancer through financial support", and "Better allocation of funds for screening programs".

Synthesized finding 4: Stewardship

This synthesized finding is composed of one category and three findings. In this synthesized finding, the stewardship and the main missions of health services providers is discussed.

The category "Organizational factors" conclude three findings of "Overall focus on quality and prevention as a primary part of organization's mission and values", "Trust in the structure of the integrated health system to enable alignment of evidence-based CRC screening approaches with available resources and department roles", and "Presence of primary care physician (PCP) champions to assist other providers in navigating and integrating latest research with organizational goals and patient demand".

ConQual summery of findings

Table 2 shows the summary of findings that includes the major elements of the review and details how the ConQual score was developed for each synthesized finding.

Discussion

Findings from this systematic review summarized the policies and strategies applied by the studies to prevent common gastrointestinal cancers worldwide. Four meta-synthesized findings resulted from this study as below: "service provision", "resource generation", "financing", and "stewardship".

Synthesized findings 1 are composed of policies directly related to service provision of the population and controlling the major risk factors. Physical activity and consumption

Table 2: ConQual summery of findings

Systematic review title: Policies for prevention of common gastrointestinal cancers

Population: Patients of any age, gender and cultural background that has been prevented from a common gastrointestinal cancer, physicians and all health services providers, managers and policy makers.

Phenomena of interest: Policies and strategies for prevention of common gastrointestinal cancers

Context: Studies conducted in any country

Synthesized finding	Type of research	Dependability	Credibility	ConQual score	Comments
Service provision	Qualitative	Moderate *	Downgraded 2 levels due to mix of unequivocal (U), credible (C) and unsupported (US) findings: 21 U+4 C+2 US	Very low	Downgraded three levels due to dependability and credibility of primary studies
Resource generation	Qualitative	Moderate *	Downgraded 1 level due to mix of unequivocal (U) and credible (C): 9 U+2 C	Low	Downgraded two levels due to dependability and credibility of primary studies
Financing	Qualitative	Moderate *	Downgraded 1 level due to mix of unequivocal (U) and credible (C): 6 U+3 C	Low	Downgraded two levels due to dependability and credibility of primary studies
Stewardship	Qualitative	High *	Downgraded 1 level due to mix of unequivocal (U) and credible (C): 2 C+1U	Moderate	Downgraded one level due to credibility of primary studies

*For synthesized finding 1, of the nine studies, three addressed four of the dependability questions, five addressed three, and one addressed two. So of the nine studies, six had moderate level and three had high level of dependability and the total level of dependability for synthesized finding 1 is moderate. For synthesized finding 2, of the three studies, one addressed four of the dependability questions, and two addressed three. Due to the equal number of high level and moderate level studies in this synthesized finding, we referred to the number of findings. Nine of the findings in synthesized finding 2 caught high level and two caught moderate level of dependability. For synthesized finding 3, the one study included have addressed three dependability questions. So the total level of dependability for synthesized finding 3 is moderate. For synthesized finding 4, the one study included have addressed four dependability questions. Therefore, the total level of dependability for synthesized finding 4 is high.

of red meat were found in the studies included in this review. Similarly, DeTroye and colleagues reported in their review study that physical activity improved overall health of patients survived from colorectal cancer as well as prevented recurrence of this cancer.[29] Anderson and co-authors in their randomized controlled trial provided an intervention of physical activity within colorectal cancer screening program and reached significant decrease in their participant's weight that offered considerable potential for risk reduction of disease in older adults.[30] Pimpin and colleagues mentioned in their study that lifestyle changes such as reducing alcohol intake and weight reduction can lead to a decrease in the burden of liver diseases.[31] The findings from the current study showed that vaccination is a good strategy for the prevention of viral hepatitis B and C. Similarly, Wang and colleagues,[32] Chang,[33] Meireles and co- authors,[34] and Chang and co-authors[35] reported in their research that liver cancer and hepatitis B virus can be effectively prevented through vaccination. Public education about risk factors and importance of screening and early detection of gastrointestinal cancers are findings of current study. Different studies in the world illustrated that public awareness of gastrointestinal cancer's symptoms, risk factors, and screening modalities are low.[36-42] There are some educational policies and strategies should be designed to public about relative subjects by policy makers. Finally, in the last category of the first synthesized finding, improving geographical and financial aspects of access to care, decreasing socioeconomic differences of service consumers and reducing bureaucracy and additional stages of getting services were proposed. Signorelli and colleagues showed socioeconomic disparities in access to screening program of hepatocellular carcinoma in public services setting, which provided services to the large population in Brazil.[43]

Synthesized finding 2 was aggregated form four categories of guideline development, enhancing provider ability, enhancing knowledge among providers, and use of technology. These are main resources of health system that are essential in care provision. In Japan, cancer screening guidelines have become a valuable tool for developing evidence-based policies for national cancer screening programs. Accordingly, clinical practice guidelines for gastric and colorectal cancers have been published over the last 15 years in this country.[44] Federici and co-authors indicated in their study that involvement of general physicians in colorectal cancer screening programs is crucial due to their direct contact with the healthy population. They also found that general physicians' knowledge and compliance with clinical practice guidelines are important factors to enhance screening rate.[45] The Results of qualitative research showed that primary health care providers plays an important role in guiding individuals for decisions of cancer screenings; so, it is important to improve these providers' knowledge and communication skills.[46] Koo and colleagues in their study found that the role of general physicians in motivating ethnically diverse population is very important in colorectal cancer screening programs due to the unawareness of population. Therefore, increasing general physicians' awareness is essential.[47] The results of a literature review showed that there should be a multidisciplinary team approach between providers of primary care including primary care physicians, nurses, physician assistants, nurse practitioners, clerical staff, health educators, and behavioral scientists.[48] Use of technology in the second category of the second synthesized finding implies the use of electronic medical record and automated telephone outreach as patient-centered, user friendly and acceptable ways of follow- up for patients and health care providers.[26] Telephone outreach intervention for colorectal screening is indicated to improve the screening rate significantly.[49] Also, the results of a Cochrane systematic review showed that automated telephone communications improved patients' health behaviors in screening programs.[50] The results of a literature review showed that adoption of electronic medical records can improve cancer screening rates by empowering patients in decision making on preventive programs.[48]

Synthesized finding 3 and 4 in this review relates to financing and stewardship. Quality of care is a major factor in improving prevention and screening rates. Gastroenterologists should upgrade their services quality improvement, and audit and re-audit their services.[51] The results of a study illustrated that implementation of a quality improvement program in a colonoscopy center increased the rate of cancer detection in population.[52] Integrating the latest evidence with organizational goals and patient demand was one of the components of synthesized finding 4 in the current study. Green and colleagues in their research showed that collaboration between primary care providers and research team led to a successful project that improved colorectal cancer screening rates from 75.1% at the baseline prior to program start up to 78.0% after 12 months of intervention.[53,54]

Conclusion

This systematic review synthesized the findings of nine qualitative studies, which captured the policies for the prevention of common gastrointestinal cancers. In order to reach a comprehensive evidence informed policy package for the prevention of gastrointestinal cancers, there should be a great communication among interventions conducted directly on patients, interventions related to health system and its infrastructure, and interventions related to resources of health system including human resources and financial resources.

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Conflicts of interest

There are no conflicts of interest.

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References

1. WHO. Time to deliver: Report of the WHO Independent high-level commission on noncommunicable diseases. 2018.
2. Fidler MM, Gupta S, Soerjomataram I, Ferlay J, Steliarova-Foucher E, Bray F. Cancer incidence and mortality among young adults aged 20–39 years worldwide in 2012: A population-based study. Lancet Oncol 2017;18:1579-89.
3. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. Lancet 1997;349:1498-504.
4. Pourhoseingholi MA, Vahedi M, Baghestani AR. Burden of gastrointestinal cancer in Asia; an overview. Gastroenterol Hepatol Bed Bench 2015;8:19-27.
5. Darabi M, Lari MA, Motevalian SA, Motlagh A, Arsang-Jang S, Jaberi MK. Trends in gastrointestinal cancer incidence in Iran, 2001-2010: A joinpoint analysis. Epidemiol Health 2016;38:e2016056.
6. Henderson TO, Oeffinger KC. Reducing the global cancer burden among young adults. Lancet Oncol 2017;18:1554-5.
7. Global Burden of Disease Cancer C. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 32 cancer groups, 1990 to 2015: A systematic analysis for the global burden of disease study. JAMA Oncol 2017;3:524-48.
8. Daar AS, Singer PA, Persad DL, Pramming SK, Matthews DR, Beaglehole R, *et al*. Grand challenges in chronic non-communicable diseases. Nature 2007;450:494-6.
9. Bennett JE, Stevens GA, Mathers CD, Bonita R, Rehm J, Kruk ME, *et al*. NCD Countdown 2030: Worldwide trends in non-communicable disease mortality and progress towards Sustainable Development Goal target 3.4. Lancet 2018;392:1072-88.
10. Assembly U. Political declaration of the high-level meeting of the general assembly on the prevention and control of non-communicable diseases. 2011.
11. WHO. Global action plan for the prevention and control of noncommunicable diseases 2013-20202013. Report No.: 9241506237.
12. Peykari N, Hashemi H, Dinarvand R, Haji-Aghajani M, Malekzadeh R, Sadrolsadat A, *et al*. National action plan for non-communicable diseases prevention and control in Iran; A response to emerging epidemic. J Diabetes Metab Disord 2017;16:3.
13. Zargaraan A, Dinarvand R, Hosseini H. Nutritional traffic light labeling and taxation on unhealthy food products in Iran: Health policies to prevent non-communicable diseases. Iran Red Crescent Med J 2017;19:18.
14. Juma PA, Wisdom J. Introduction: Non-communicable disease prevention policies in six African countries. BMC Public Health 2018;18(Suppl 1):955.
15. Mukanu MM, Zulu JM, Mweemba C, Mutale W. Responding to non-communicable diseases in Zambia: A policy analysis. Health Res Policy Syst 2017;15:34.
16. Mendis S. The policy agenda for prevention and control of non-communicable diseases. Br Med Bull 2010;96:23-43.
17. JBI. Joanna Briggs Institute Reviewers' Manual: 2014 edition. Australia: The Joanna Briggs Institute, The University of Adelaide; 2014.
18. Munn Z, Porritt K, Lockwood C, Aromataris E, Pearson A. Establishing confidence in the output of qualitative research synthesis: The ConQual approach. BMC medical research methodology 2014 Sep 20;14:108.
19. Buchman S, Rozmovits L, Glazier RH. Equity and practice issues in colorectal cancer screening: Mixed-methods study. Canadian Family Physician 2016;62:e186-93.
20. Dawson G, Crane M, Lyons C, Burnham A, Bowman T, Perez D, *et al*. General practitioners' perceptions of population based bowel screening and their influence on practice: A qualitative study. BMC Fam Pract 2017;18:36.
21. Bridges JF, Gallego G, Blauvelt BM. Controlling liver cancer internationally: A qualitative study of clinicians' perceptions of current public policy needs. Health Res Policy Syst 2011;9:32.
22. Clavarino AM, Janda M, Hughes KL, Del Mar C, Tong S, Stanton WR, *et al*. The view from two sides: A qualitative study of community and medical perspectives on screening for colorectal cancer using FOBT. Prev Med 2004;39:482-90.
23. Dowswell G, Ryan A, Taylor A, Daley A, Freemantle N, Brookes M, *et al*. Designing an intervention to help people with colorectal adenomas reduce their intake of red and processed meat and increase their levels of physical activity: A qualitative study. BMC Cancer 2012;12:255.
24. Goel V, Gray R, Chart P, Fitch M, Saibil F, Zdanowicz Y. Perspectives on colorectal cancer screening: A focus group study. Health Expect 2004;7:51-60.
25. Jilcott Pitts SB, Lea CS, May CL, Stowe C, Hamill DJ, Walker KT, *et al*. "Fault-line of an earthquake": A qualitative examination of barriers and facilitators to colorectal cancer screening in rural, Eastern North Carolina. J Rural Health 2013;29:78-87.
26. Liles EG, Schneider JL, Feldstein AC, Mosen DM, Perrin N, Rosales AG, *et al*. Implementation challenges and successes of a population-based colorectal cancer screening program: A qualitative study of stakeholder perspectives. Implement Sci 2015;10:41.
27. Sarfaty M, Stello B, Johnson M, Sifri R, Borsky A, Myers RM. Colorectal cancer screening in the framework of the medical home model: Findings from focus groups and interviews. Am J Med Qual 2013;28:422-8.
28. WHO. Report 2000 health systems: Improving performance.
29. DeTroye A, Christner M, Eganhouse D, Manning B, Sunkin E, Gregory T. The effects of physical activity on survival in patients with colorectal cancer. JAAPA 2018;31:21-5.
30. Anderson AS, Craigie AM, Caswell S, Treweek S, Stead M, Macleod M, *et al*. The impact of a bodyweight and physical activity intervention (BeWEL) initiated through a national colorectal cancer screening programme: Randomised controlled trial. BMJ 2014;348:g1823.
31. Pimpin L, Cortez-Pinto H, Negro F, Corbould E, Lazarus JV, Webber L, *et al*. Burden of liver disease in Europe: Epidemiology and analysis of risk factors to identify prevention policies.

J Hepatol 2018;69:718-35.
32. Wang Z, Huang S, Zhao Y, Zhao W, Liang X. [Role of vaccination in chronic disease prevention and control]. Zhonghua Yu Fang Yi Xue Za Zhi 2015;49:757-60.
33. Chang MH. Cancer prevention by vaccination against hepatitis B. Recent Results Cancer Res 2009;181:85-94.
34. Meireles LC, Marinho RT, Van Damme P. Three decades of hepatitis B control with vaccination. World J Hepatol 2015;7:2127-32.
35. Chang MH, You SL, Chen CJ, Liu CJ, Lee CM, Lin SM, *et al*. Decreased incidence of hepatocellular carcinoma in hepatitis B vaccinees: A 20-year follow-up study. J Natl Cancer Inst 2009;101:1348-55.
36. Mhaidat NM, Al-Husein BA, Alzoubi KH, Hatamleh DI, Khader Y, Matalqah S, *et al*. Knowledge and awareness of colorectal cancer early warning signs and risk factors among university students in Jordan. J Cancer Educ 2018;33:448-56.
37. Al-Sharif MN, Fayi KA, Alobaidi AA, Alshamrani BA. Awareness of colorectal cancer among public in Asir region. J Family Med Prim Care 2018;7:87-92.
38. Zafer E, Tanriotakulu P, Atakul T, Omurlu IK, Yuksel H. Status and awareness of cervical, breast, and colon cancer screening in a Turkish city. Eur J Gynaecol Oncol 2017;38:391-7.
39. Shah SC, Nunez H, Chiu S, Hazan A, Chen S, Wang S, *et al*. Low baseline awareness of gastric cancer risk factors amongst at-risk multiracial/ethnic populations in New York City: Results of a targeted, culturally sensitive pilot gastric cancer community outreach program. Ethn Health 2020;25:189-205.
40. Majidi A, Majidi S, Salimzadeh S, Khazaee-Pool M, Sadjadi A, Salimzadeh H, *et al*. Cancer screening awareness and practice in a middle income country; A systematic review from Iran. Asian Pac J Cancer Prev 2017;18:3187-94.
41. Galal YS, Amin TT, Alarfaj AK, Almulhim AA, Aljughaiman AA, Almulla AK, *et al*. Colon cancer among older saudis: Awareness of risk factors and early signs, and perceived barriers to screening. Asian Pac J Cancer Prev 2016;17:1837-46.
42. Benito L, García M, Binefa G, Mila N, Vidal C, Lluch MT, *et al*. Cross-sectional survey on awareness of colorectal cancer and a screening programme for primary health care professionals in Catalonia, Spain. Eur J Cancer Care (Engl) 2016;25:992-1004.
43. Yoon JY, Cha JM, Jeen YT. Quality is the key for emerging issues of population-based colonoscopy screening. Intest Res 2018;16:48-54.
44. Signorelli IV, Gonçalves PL, Gonçalves LL, Emery Ferreira LS, Parpaiola Mendonça AT, Franklin GL, *et al*. Socioeconomic disparities in access to a hepatocellular carcinoma screening program in Brazil. Clinics (Sao Paulo) 2016;71:361-4.
45. Hamashima C. Cancer screening guidelines and policy making: 15 years of experience in cancer screening guideline development in Japan. Jpn J Clin Oncol 2018;48:278-86.
46. Federici A, Giorgi Rossi P, Bartolozzi F, Farchi S, Borgia P, Guasticchi G. Survey on colorectal cancer screening knowledge, attitudes, and practices of general practice physicians in Lazio, Italy. Prev Med 2005;41:30-5.
47. Benito L, Farre A, Binefa G, Vidal C, Cardona A, Pla M, *et al*. Factors related to longitudinal adherence in colorectal cancer screening: Qualitative research findings. Cancer Causes Control 2018;29:103-14.
48. Koo JH, You MY, Liu K, Athureliya MD, Tang CW, Redmond DM, *et al*. Colorectal cancer screening practise is influenced by ethnicity of medical practitioner and patient. J Gastroenterol Hepatol 2012;27:390-6.
49. Triantafillidis JK, Vagianos C, Gikas A, Korontzi M, Papalois A. Screening for colorectal cancer: The role of the primary care physician. Eur J Gastroenterol Hepatol 2017;29:e1-7.
50. Dietrich AJ, Tobin JN, Robinson CM, Cassells A, Greene MA, Dunn VH, *et al*. Telephone outreach to increase colon cancer screening in medicaid managed care organizations: A randomized controlled trial. Ann Fam Med 2013;11:335-43.
51. Kempe KL, Shetterly SM, France EK, Levin TR. Automated phone and mail population outreach to promote colorectal cancer screening. Am J Manag Care 2012;18:370-8.
52. Posadzki P, Mastellos N, Ryan R, Gunn LH, Felix LM, Pappas Y, *et al*. Automated telephone communication systems for preventive healthcare and management of long-term conditions. Cochrane Database Syst Rev 2016;12:CD009921.
53. Viola LA, Cassella F, Wonaga A, Arnao Dellamea G, Di Paola L, Ubeira Salim R, *et al*. Implementation of a program to improve the quality of colonoscopy increases the neoplasia detection rate: A prospective study. Endosc Int Open 2016;4:E68-72.
54. Green BB, Fuller S, Anderson ML, Mahoney C, Mendy P, Powell SL. A quality improvement initiative to increase colorectal cancer (CRC) screening: Collaboration between a primary care clinic and research team. J Fam Med 2017;4:1115.