REVIEW

Cancer Screening Awareness and Practice in a Middle Income Country; A Systematic Review from Iran

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Abstract

   Objective: Ageing population and noticeable changes in lifestyle in developing countries like Iran caused an increase in cancer incidence. This requires organized cancer prevention and screening programs in population level, but most importantly community should be aware of these programs and willing to use them. This study explored existing evidence on public awareness and practice, as well as, adherence to cancer screening in Iranian population. **Methods:** Major English databases including Web of Science, PubMed, Scopus, and domestic Persian databases i.e., SID, Magiran, and Barakat search engines were searched. All publications with focus on Iranian public awareness about cancer prevention, screening, and early detection programs which were published until August 2015, were explored in this systematic review. For this purpose, we used sensitive Persian phrases/key terms and English keywords which were extracted from medical subject headings (MeSH). Taking PRISMA guidelines into considerations eligible documents, were evaluated and abstracted by two separate reviewers. **Results:** We found 72 articles relevant to this topic. Screening tests were known to, or being utilized by only a limited number of Iranians. Most Iranian women relied on physical examination particularly self-examination, instead of taking mammogram, as the most standard test to find breast tumors. Less than half of the average-risk adult populations were familiar with colorectal cancer risk factors and its screening tests, and only very limited number of studies reported taking at least one time colonoscopy or FOBT, at most 5.0% and 15.0%, respectively. Around half of women were familiar with cervical cancer and Pap-smear test with less than 45% having completed at least one lifetime test. The lack of health insurance coverage was a barrier to participate in screening tests. Furthermore some people would not select to be screened only because they do not know how or where they can receive these services. **Conclusion:** Low awareness and suboptimal use of screening tests in Iran calls for effective programs to enhance intention and compliance to screening, improving the patient-physician communication, identifying barriers for screening and providing tailored public awareness and screening programs.

Keywords: Screening- early detection- screening awareness- knowledge- attitude and practice- primary prevention-Iran,

Introduction

   Most developing countries face with an increase in the incidence of Noncommunicable diseases NCDs, including cancers (Ahmadi et al., 2016) mostly due to epidemiologic transitions and perceptible shift in lifestyle towards unhealthy habits (Chan, 2007; WHO, 2015). Based on GLOBOCAN estimates, by 2030 there will be 26 million deaths due to cancer, of which 60% will occur in low and middle income countries (LMICs). In order to combat the increasing burden of cancer, cancer control programs have been systemized throughout the world on rising public awareness and implementing screening or early detection (Petersen, 2009; WHO, 2006). Data of developed countries suggest that national cancer screening programs have been effective in increasing survival rates

in cancer patients (Berry et al., 2005; Le Galès-Camus et al., 2007; López-Gómez et al., 2013; Torre et al., 2015; Trevena, 2009).

   As a middle income country in West Asia, in Iran cancer is the 3rd major cause of mortality and disability behind cardiovascular diseases and traffic injuries (Ferlay, et al., 2013). Similar to most LMICs currently there is no mass screening program in Iran for early detection of cancers and the policy for cancer screening in Iran is opportunistic. Therefore, only people who are well-informed about the importance of these tests include cancer screening in their health schedules (Adab, et al., 2004).

   To date, scattered data have been published on public knowledge level and their attitude and practice (KAP) towards cancer screening and prevention in Iran. Yet, the overall status on public awareness or preventive behaviors

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about cancer, and the applicability of these data in policy making has not been studied.

The objective of this study, therefore, is to review the publications on cancer awareness and screening practice in Iran addressing the following topics: general awareness; cancer specific knowledge; health knowledge about cancer; interventions to enhance adherence to screening tests; prevalence of preventive and early detection behaviors e.g., rate of use of screening tests; predictors or correlates of adherence to screening tests; and barriers to/ or reasons for non-adherence to screening tests.

Material and Methods

Search strategy and inclusion criteria: Major English databases including Web of Science (WOS), PubMed, Scopus, and domestic Persian databases including SID, Magiran, and Barakat search engines were searched. Using a sensitive Persian phrases key terms and English keyword list, extracted from medical subject headings (MeSH) all publications with focus on Iranian public awareness about cancer prevention and early detection programs were explored in this systematic review. Eligible articles were extracted based on our inclusion/exclusion criteria. The end date of search was determined as the end of August 2015 (Appendix 1).

Data extraction

Only, records which had investigated the awareness and practice toward cancer screening and prevention in general population were extracted and those targeting specific groups like health professionals or medical students, teachers, university or school students and so on, were excluded from further analysis. This study is limited to review publications pertaining to four cancers i.e., (CRC), breast, cervical, and oral cancers, as recommended by World Health Organization (WHO) for screening in developing countries (Le Galès-Camus et al., 2007). Following PRISMA guideline for data extraction (Moher et al., 2009), we included information on title, study type, sampling frame, age-groups, gender, publication date, sample size, and a brief description demonstrating the knowledge, attitude and practice toward cancer prevention or screening.

Regarding sampling methods and the quality of information reported by different articles data reflecting descriptive information of studies and their main findings were extracted. Meta-analysis was taken into consideration.

Results

Overall, this search strategy found 72 articles from which 45 were attributed to breast cancer and the other 16, 6 and, 5 records respectively were about cervical cancer, CRC and cancers of oral cavity (see Flow diagram).

Knowledge about cancers risk factors, symptoms and screening tests

Among all extracted documents 21 studies had addressed population awareness regarding cancer risk factors, 55 reported awareness status for existing cancer screening tests, and finally 25 studies had evaluated awareness about warning signs of cancer and their known symptoms. Also two studies had provided a general report regarding overall knowledge about cancer risk factors, related warning signs or symptoms and screening behavior (Supplementary Table 1).

Noticeably poor awareness about CRC risk factors and screening were reported, that is, the necessity of CRC screening among average-risk adults above 50 years was stated only by 20% of investigated participants. On the other hand, FOBT and colonoscopy, as CRC screening tests were respectively known by around 40.0% and 50.0% of the studied population.

A small part of people were familiar with oral cancer risk factors. Few people knew the importance of oral hygiene and taking care of dentures as preventive methods for cancer in mouth cavity. Also almost less than half of people were aware of the carcinogenesis effect of eating/ drinking hot foods/beverages. None of studies documented individuals' awareness regarding oral screening.

Half of Iranian women were not familiar with breast cancer risk factors and related screening tests. Most studies had focused on breast physical examination, either performed by women themselves or by their clinicians. Mammography, which currently is the most reliable test for early detection was hardly known as a breast screening test in most regions (with awareness level varying from 3.4% to 64.0%).

Only few records had reported Iranian women's knowledge about cervical cancer risk factors. Around half of studied women knew the early signs and symptoms of cervical cancer. Although more than one test is available for cervical cancer screening in Iran's laboratories,
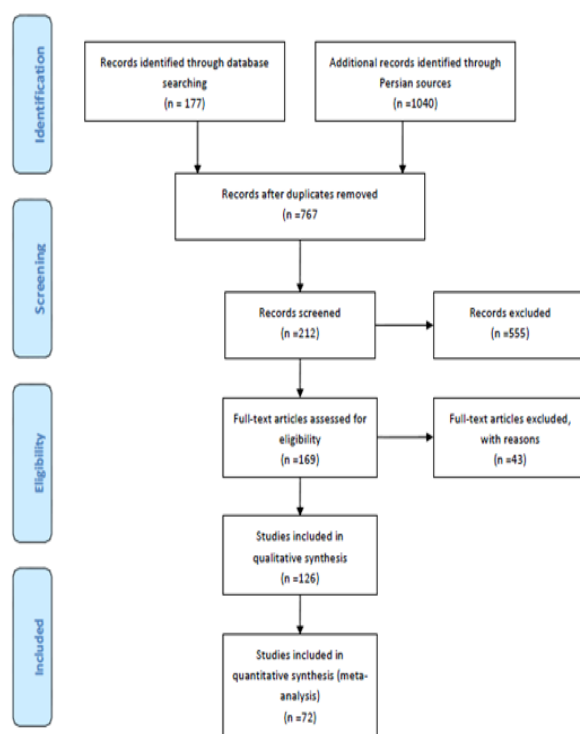
Flow diagram. Literature Selection Flow Diagram According PRISMA Guideline

Table 1. Facilitators and Barriers of Participation in Cancer Screening Programs

Cancer type	Facilitators	Barriers
Colon	Doing annual health controls and recommendation of health providers (Javadzade, et al., 2012)	Having no symptoms (Salimzadeh, et al., 2012) Fear of finding positive result (Javadzade, et al., 2012; Salimzadeh, et al., 2012) High cost (Salimzadeh, et al., 2012) No recommendation of health providers (Javadzade, et al., 2012; Salimzadeh, et al., 2012) Feeling embarrassed (Javadzade, et al., 2012) Time limits (Javadzade, et al., 2012) No knowledge about where they should go for screening (Javadzade, et al., 2012) Negative family history of cancer (Salimzadeh, et al., 2012) Lack of awareness about the necessity of screening (Javadzade, et al., 2012; Salimzadeh, et al., 2012)
Breast	Educational level (Ahmadian, et al., 2012) Being married (Ahmadian, et al., 2012; Godazandeh, et al., 2006; Montazeri, et al., 2008; Noroozi and Tahmasebi, 2011) Having health insurance (Ahmadian, et al., 2012) Husband's higher education level (Charkazi, et al., 2013) Using modern birth control devices (Noroozi and Tahmasebi, 2011) Awareness about cancer (Soltanahmadi, et al., 2010) Recommendation of health providers (Soltanahmadi, et al., 2010; Yadollahie, et al., 2011) Higher socioeconomic status (Farshbaf-Khalili, et al., 2015; Soltanahmadi, et al., 2010) Previous breast benign diseases (Allahverdipour, et al., 2011; Banaeian, et al., 2006; Farshbaf-Khalili, et al., 2015; Soltanahmadi, et al., 2010) Number of children (Banaeian, et al., 2006; Farshbaf-Khalili, et al., 2015) Positive attitudes (Banaeian, et al., 2006; Salimi, et al., 2010) History of hormone therapy (Banaeian, et al., 2006) Experience of breastfeeding (Farshbaf-Khalili, et al., 2015)	Having no symptoms (Ghazdehi, et al., 2013) Fear of finding cancer (Farshbaf-Khalili, et al., 2015; Nojomi, et al., 2014) (Pilehvarzadeh, et al., 2015) High cost (Farshbaf-Khalili, et al., 2015) Negative attitudes (Ghazdehi, et al., 2013) Time limits (Farshbaf-Khalili, et al., 2015; Laluie and Kashanizadeh, 2006) Older age (Ahmadian, et al., 2012; Allahverdipour, et al., 2011; Berdi-Ghourchaei, et al., 2013; Farshbaf-Khalili, et al., 2015; Godazandeh, et al., 2006; Montazeri, et al., 2008; Ramezani, et al., 2001) Unfamiliarity with mammography (Ghazdehi, et al., 2013) No health insurance (Allahverdipour, et al., 2011) Negative family history for breast cancer (Allahverdipour, et al., 2011; Farshbaf-Khalili, et al., 2015; Ghazdehi, et al., 2013; Godazandeh, et al., 2006) No recommendation of health providers (Farshbaf-Khalili, et al., 2015; Nojomi, et al., 2014; Sakkaki, et al., 2015) No awareness about the necessity of screening (Banaeian, et al., 2006; Charkazi, et al., 2013; Ghazdehi, et al., 2013; Godazandeh, et al., 2006; Heidari, et al., 2007; Ramezani, et al., 2001; Salimi, et al., 2010; Simi, et al., 2009; Soltanahmadi, et al., 2010) No experience of mammography among friends (Ghazdehi, et al., 2013)
Cervix	Ethnicity (Khojasteh, 2004) Recommendation of friends (Khojasteh, 2004) Living in urban areas vs. Rural (Hadi and Azimirad, 2010) Awareness about cancer (Hadi and Azimirad, 2010; Soltanahmadi, et al., 2010) Older age (Hadi and Azimirad, 2010) Socioeconomic status (Khojasteh, 2004; Soltanahmadi, et al., 2010) Educational level (Khojasteh, 2004) Using modern birth control devices (Khojasteh, 2004) Self-efficacy through employment (Soltanahmadi, et al., 2010) Recommendation of health providers (Khojasteh, 2004)	Having no symptoms (Soltanahmadi, et al., 2010) Feeling embarrassed (Soltanahmadi, et al., 2010) Negative family history for breast cancer (Soltanahmadi, et al., 2010)

Pap-smear test has been taken into considerations more frequently by the investigators. Around half of studied women had an average to good level of knowledge about cervical cancer risk factors and screening tests.

Attitudes toward cancer screening

Out of total documents, 13 studies had evaluated people's attitudes toward cancer screening and prevention. In a study, only 29.0% of participants believed that CRC screening decrease the chance of CRC related mortality. The majority of studied women were interested in learning about cervical and breast cancer screening and prevention methods. Most women were concerned with breast cancer and less than 10.0% considered breast cancer as a preventable cancer. While more positive beliefs were reported regarding the effectiveness of screening

tests in the case of breast and cervical cancers, only few people believed that early detection of CRC and cancer of mouth cavity provides better prognosis. Some people did not intend to take screening tests due to fear of being diagnosed with cancer (Supplementary Table 2).

Screening practice

Detailed information about utilization of different screening tests is brought in Table 3. Among average-risk people, only 5.0% had colonoscopy experience and less than 15% at least a prior fecal occult blood test (FOBT).

Mammography was infrequently used by Iranian women with only 6.4% having at least one lifetime mammogram. Mammography practice was poorest in the North of Iran and highest in Hamadan a city in the West of Iran. Adherence to regular cervical screening is still

sub-optional among Iranian women, with an estimated 17.0-36.0% participation rate for regular screening.

Few studies had reported facilitating and hindering factors of public cancer screening behavior (Table 1). Accordingly socioeconomic status, adherence to regular health check-ups and awareness about cancer signs and symptoms, as well as, existing screening programs were defined as influential factors on screening practice among Iranians.

Intervention studies

Application of health promotion models, resulted a significant difference in utilization of pap-smear, 97.1% vs. 2.9% (Pirzadeh and Mazaheri, 2012), FOBT, 26.0% vs. 2.8% (Salimzadeh et al., 2014) and 83.1% vs. 14.1% (Moattari et al., 2009), as well as, BSE 76.7% vs. 2.9% (Aghamolaei et al., 2011) among intervention group compared to control group. Nonetheless, after health-educational consults regarding screening colonoscopy only 5.0% of participants underwent colonoscopy, while none of the participants in the control group, accepted to take colonoscopy (Salimzadeh, et al., 2014).

Discussion

This systematic review revealed that there is suboptimal awareness about cancer risk factors and known symptoms among Iranian population. Cancer screening tests are known to, or being utilized by a very limited number of people in Iran. In case of breast cancer screening, most Iranian women relied on physical examination particularly self-examination instead of taking mammogram, known as the most valid screening test. Less than half of average-risk adult men and women above 50 were familiar with CRC screening tests and only very limited number of studies reported taking at least one time colonoscopy or FOBT, at most 5.0% and 15.0%, respectively. Around half of women were familiar with the current cervical screening method, i.e., pap-smear test and less than 45% at least had once pap-smear test. There was a scarce of KAP studies about cancer of mouth cavity. The lack of health insurance coverage was a barrier to participation in screening tests; that is economic independency would have facilitated individuals' participation in screening tests particularly in women. Furthermore, in Iran some people may not select to be screened only because they do not know how or where they can receive these services.

Iran, as an example of middle-income countries, had conservable achievements in delivering basic health care to low-income rural residents during past decades (Hsiao, 2007). Currently in rural and low-population cities, primary health care services and family physician program provide primary prevention targeting common risk factors of NCDs (Bonita, et al., 2013; Jannati et al., 2014; Naghavi 2006; WHO, 2013; WHO, 2014). In practice, most of the preventive care services such as screening tests and dental care are not covered by current health insurance policies, while they cover almost all therapeutic facilities like cancer treatment and surgeries (Jannati et al., 2014). In the absence of national cancer

screening programs, people do not look for screening and preventive services; rather they are utilizing curative and rehabilitative services (Jannati et al., 2014).

Studies to date poorly support the effectiveness of BSE educational programs in decreasing mortality related to breast cancer (Long et al., 2010; Thomas et al., 2002). Recent guidelines emphasize on the importance of breast self-awareness instead of BSE, to encourage women to know their body and report any changes that may be related to breast cancer (Bevers et al., 2015; Oeffinger et al., 2015). During six decades breast cancer survival increased considerably in USA, which is mainly attributable to mammography and effective surgical procedures (Shulman et al., 2010). Yet, as brought in results many women in Iran are not familiar with existing breast screening facilities. Our review showed marital status as a positive moderator for participation in breast screening which is comparable with the results from other studies (Selvin and Brett, 2003; Sutton et al., 1994). In most eastern cultures gynecological controls, including BCE, are mainly utilized by married (or ever married) women. This means that never married women are less likely to comply with screening guidelines and they might lose the chance of being diagnosed in early stages. Therefore in order to enhance participation and adherence to breast screening programs, health providers should make efforts targeting all eligible women, i.e., both married and single women.

At least for CRC screening and mammography test, physicians had key role in encouraging their patients to undertake screening tests (Farshbaf-Khalili et al., 2015; Javadzade et al., 2012; Nojomi et al., 2014; Sakkaki et al., 2015; Salimzadeh et al., 2012). Currently there is no national guidelines for cancer screening in Iran. Therefore, expert physicians routinely follow guidelines and instructions issued for other populations in their clinical practice (Delavari et al., 2014a; Delavari et al., 2014b; Delavari et al., 2015; Majidi et al., 2015). Although, physicians' adherence to these guidelines in making sound advice to their healthy clients remains unclear.

Cancer screening tests are offered to healthy or apparently healthy individuals. In most developing countries there is limited access to early detection and primary care (Breen et al., 2001). While participation in the current opportunistic screening programs initially requires adequate public awareness (Adab et al., 2004; Denny et al., 2006; Trevena, 2009), only limited number of awareness rise programs had been successful in increasing participation in cervical screening, BSE and fecal-based CRC screening tests. On the other hand, some studies have shown that awareness rise is necessary but not the only influential factor on the participation rate in screening colonoscopy (Farshbaf-Khalili et al., 2015; Javadzade et al., 2012; Nojomi et al., 2014; Sakkaki et al., 2015; Salimzadeh et al., 2012).

Some studies had mentioned economic barriers, such as the lack of health insurance, or partial support of current health insurance, as the hindering factors for taking screening tests or adherence to repeated screenings (Ahmadian et al., 2012; Allahverdipour et al., 2011; Farshbaf-Khalili et al., 2015; Khojasteh 2004; Salimzadeh

et al., 2012; Soltanahmadi et al., 2010). On the other hand, insufficient or even inaccurate information about screening tests have been mentioned as possible causes for poor intention to screening programs, even among people with higher economic status (Allahverdipour et al., 2011; Banaeian et al., 2006; Charkazi et al., 2013; Farshbaf-Khalili et al., 2015; Ghazdehi et al., 2013; Godazandeh et al., 2006; Heidari et al., 2007; Javadzade et al., 2012; Nojomi et al., 2014; Ramezani et al., 2001; Sakkaki et al., 2015; Salimi et al., 2010; Salimzadeh et al., 2014; Simi et al., 2009; Soltanahmadiet al., 2010). A major reason for failure of cancer screening programs is the insufficient resources devoted by health systems which may be due to scarce resources, lack of information and difficulties in the advertising of screening programs (2002).

Overall, considering the very low prevalence of oral hygiene behaviors (Asgari et al., 2011) and obvious burden of complications related to tobacco use among Iranian populations including cancers of oral cavity (Meysamie et al., 2010), high incidence and proportionately lower survival rates of breast cancer, increasing incidence of CRC, as well as, the high mortality to incidence ratio of cervical cancer in the nation (Majidi et al., 2015), establishment of national screening programs as suggested by WHO, are recommended (Ferlay et al., 2013; Majidi et al., 2015; Pourhoseingholi and Zali 2012; Rezaianzadeh et al., 2009; Vahdaninia and Montazeri, 2004). In order to enhance cancer screening rates and ensure community adherence to these programs, economic obstacles should be considered besides investment on health education (Majidi et al., 2015; Soltanahmadi et al., 2010). Providing access to cost-effective screening tests and prevention methods with higher acceptance rates also providing simple periodical oral visual inspection by trained health providers may result in higher screening rates and more lifesaving benefits (Majidi et al., 2015; Subramanian et al., 2010). Studies underlined the importance of universal health coverage in provision of equal access to cancer screening by enhancing the adherence to these tests among unprivileged groups (Breen et al., 2001). With this regard, the experience of limited-resource and developed countries revealed the important impact of engaging non-governmental organizations NGOs and civil activists in disease control programs (Anderson et al., 2006; Azenha et al., 2011; Domingo et al., 2008; Gómez-Jauregui, 2004; Klugman, 2000). Establishment and development of similar societies is suggestive to Iranian communities.

Precise cancer registries in developed countries verified the effectiveness of screening tests (Long et al., 2010). Use of screening tests increased the chances of detecting cancer in primary stages. Accordingly, it causes apparent increase in cancer incidence rates, leading to good prognosis of the disease and higher survival rates (Long et al., 2010; Shulman et al., 2010). In order to promote the current health status and provide more successful cancer prevention programs in our region we will need the baseline and follow-up registry data to define future goals and objectives. National objectives and monitoring systems are critical factors in health promotion programs. Like many developed countries it is time for developing countries too, to set organized objectives for

health promotion and disease prevention (Koh, 2010). The results of this study would be utilized as the baseline data regarding the status of cancer screening in the country.

To our knowledge this is the first study that focused on exploring information related to Iranian population awareness about cancer screening and cancer prevention also their screening practice. Inclusion of population-based studies in this systematic review may provide a general view for cancer screening in Iran. All studies included in this review had reported quantitative measures consisting of sample size, proportions or rates with sufficient descriptive information. The main limitation of this study was the limited number of publications with population-based samples. Most of these studies were focused on breast cancer screening, while awareness and preventive practices towards other cancers was the concern of only a few studies.

It seems that with appropriate knowledge about cancer and related screening tests, people are more likely to participate in screening tests. This systematic review underlines the low awareness and poor performance towards cancer screening programs among Iranian population. This calls for targeted public awareness campaigns, as well as development of screening guidelines targeting both high-risk and average-risk groups.

List of Abbreviations

CRC, Colorectal cancer; BSE, Breast self-examination; CBE, Clinical breast examination; NCDs, Noncommunicable diseases; WHO, World Health Organization; KAP, Knowledge, Attitude, Practice; FOBT, Fecal Occult Blood Test; MMG, Mammogram; COL, Colonoscopy

Statement conflict of Interest
Authors specify no conflict of interest in this study.

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