Iran J Public Health, Vol. 52, No. 11, Nov 2023, pp.2313-2324

Review Article

Cervical Cancer Prevention, Its Challenges and Solutions in Iran and Worldwide: A Systematic Review

Narges Pirani [1,2], Mehdi Jafari [3], Rafat Bagherzadeh [4], Marzieh Keikhosravi [5], Hadis Pirani [6]

1. *Health Policy, Ministry of Health and Medical Education, Tehran, Iran*
2. *Health Promotion Research Center, Health School, Iran University of Medical Sciences, Tehran, Iran*
3. *Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran*
4. *English Department, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran*
5. *Ganjavian Hospital, Khuzestan, Iran*
6. *Public Administration, Payam Noor University, Khuzestan, Iran*

***Corresponding Author:** Email: pirani.n89@hotmail.com

(Received 22 Feb 2023; accepted 14 May 2023)

Abstract

Background: Widespread use of screening in high-income countries has led to significant reductions in mortality from cervical cancer. However, in Iran, the main reason for the late diagnosis of cervical cancer was the failure to perform a Pap smear (Papanicolaou). We aimed to investigate the status of cervical cancer prevention and its challenges and solutions in Iran.

Method: We conducted a systematic review of literature published from 1974 to 2021 in the electronic databases, including PubMed, Web of Science, Embase, Scopus, and Google Scholar, and retrieved all English-language articles. Following the application of the inclusion and exclusion criteria, full-text articles were identified and evaluated for eligibility. Finally, these publications were analyzed as part of the synthesis.

Results: Lower social-economic level, inadequate knowledge of screening tests and health centers for Pap test performance leading to worse outcomes such as lower screening participation or coverage.

Conclusion: By addressing these challenges through increasing education, increasing service accessibility, expanding screening programs, improving public awareness, improving insurance coverage, and establishing a control protocol for follow-up, it is possible to reduce cervical cancer incidence and mortality.

Keywords: Cervical cancer; Prevention; Challenges; Systematic review; Iran

Introduction

Cervical cancer is the eighth most common cancer among cancers and the fourth most common cancer in women (1). The WHO reported about 570,000 new cases of cervical cancer in 2018, which is 6.6% of all female cancers. Most of these (about 90%) are in poor and developing countries (2). Moreover, according to this agency, in relation to cervical cancer, the incidence and

standardized age of death of cervical cancer in the world are 13.1 and 6.9%, respectively. It is 13.0% and 8.2% in South Central Asia and 2.2 and 1.2% in Iran (1).

The establishment of primary health care (PHC) following the inefficiency of treatment-oriented care has had a significant impact on prevention programs. Screening in high-income countries has led to a reduction in cervical cancer mortality (3). However, low-and middle-income countries do not have a well-organized screening program, so cervical cancer is diagnosed in advanced stages (4).

The WHO released its Global Action Plan for 2013-2020, which includes nine goals and 25 indicators for preventing and controlling the four major no communicable diseases (i.e., cardiovascular disease, diabetes, cancer, and respiratory diseases). The "Irapen" program, which prioritizes screenings for cervical, breast, and colorectal cancer as the most preventable cancers, was put into place in Iran following this program. The National Cancer Control Program (NCCP) was also introduced as the first national program by the Cancer Center of the Ministry of Health in 2006, which is part of the Non-Communicable Disease Control Plan in Iran (5). In addition, between 2015 and 2016, a national cancer survey was conducted in Iran to increase awareness, participation, clarify misconceptions, and policymakers' involvement.

There was an active national screening program for cervical cancer prevention in Iran in the 1990s, but it was discontinued due to the low incidence of this cancer in Iran compared to Western countries, as well as its inefficiency. The current screening program is opportunity-based, which means that Pap smear tests will be performed at the ages of 30–59 at 3-year intervals, based on the recommendation of health workers at their own expense.

In Iran, the highest and lowest incidences of invasive cervical cancer are in Tehran, Yasuj, and Kohkiluyeh Boyer Ahmad provinces, respectively (6). On the other hand, participation rate in cervical cancer screening programs varied by province, ranging from 7.6% in Sistan and Baluchestan to 61.2% in Iran. In addition, analysis of the cervical cancer utilizations rates across the socio-economic levels revealed that the service is less used by high income groups (7).

Regarding the effect of cervical cancer on marital relationships and childbirth, and the effectiveness of screening programs (3), review of prevention and early detection challenges seems necessary. Policymakers may decide to modify cervical cancer preventive recommendations after identifying challenges. Furthermore, we aimed to review cervical cancer prevention challenges in Iran and around the world, as well as strategies for addressing these challenges.

Materials and Methods

Search Strategy

We conducted a systematic review of literature published from 1974 to 2021 in the electronic databases, including PubMed, Web of Science, Embase, Scopus, and Google Scholar, and retrieved all English-language articles. Iranian databases, such as Magiran, SID, Civilica, Noormags, and the Islamic World Science Citation Center (ISC), were assessed for the challenges of cervical cancer screening and prevention in Iran. we investigated all English-language studies that contained information on cervical cancer prevention and its challenges in Iran and worldwide. Primary concepts of "Cervical Cancer," "Cervical Cancer prevention," "Cervical Cancer screening," "Cervical Cancer early detection," "Cervical Cancer challenges," "Cervical Cancer barriers," "Cervical Cancer problems," "Cervical Cancer solutions," and "Cervical Cancer facilitators" were expanded to generate additional medical terms (cervix, cervical, cancer, neoplasm, cervical neoplasms, and primary diagnosis of cancer) for the search. The subject search and text word search were done separately in PubMed, Web of Science, Embase, Scopus, and Google Scholar and then combined with "OR" and "AND" operators. Combined terms were used, for example, "cervical cancer prevention" or ‘cervical cancer prevention" AND "cervical cancer challenges or "cervical cancer

barriers. Gray literature and additional articles were identified using the bibliography of the included articles.

Study Selection

Publications reporting quantitative and qualitative evidence data on cervical cancer prevention and its challenges, as well as solutions, in Iran and worldwide were included. Fig. 1 shows the selection process for the articles retrieved. Our review was done according to PRISMA guidelines (8). The initial database search retrieved 942 published English-language studies. Overall, 814 studies were excluded after a screening for duplicates. We assessed full-text article eligibility for 94 studies. Eventually, 69 studies, published between 1974 and 2021, that met the inclusion criteria and focused on cervical cancer prevention and its challenges and solutions were included for the review (3, 4, 7, 9-74).

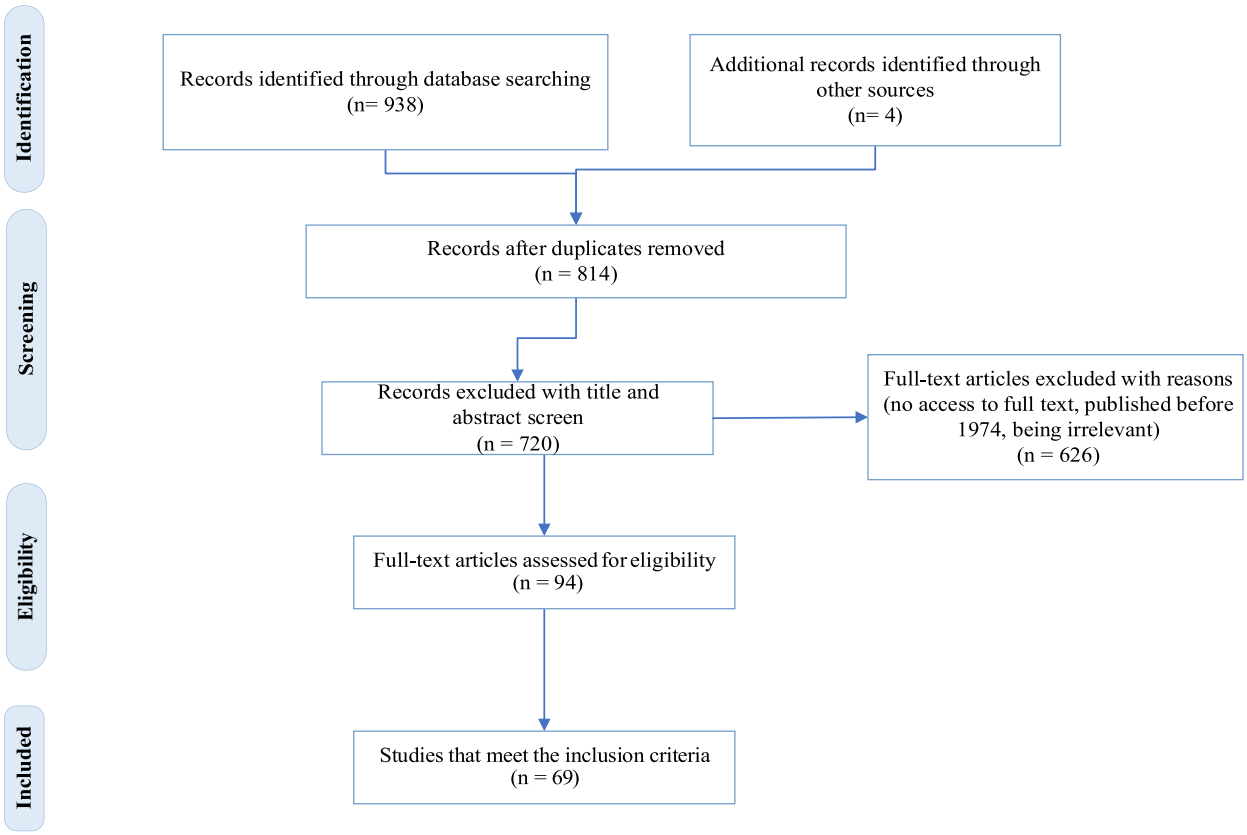

Fig. 1: PRISMA flow chart for study selection

Inclusion and Exclusion Criteria

To be included in this review, without methodology restrictions (i.e., quantitative and qualitative, mixed-method, case study, analytical, and descriptive research), and English language studies published from 1974 until 2021 on cervical cancer prevention and its challenges and solutions. Letter to the editor: Studies without full text and articles published in languages other than English are excluded as exclusion criteria.

Data Extraction and Synthesis

The primary outcome data from all articles was indexed in Microsoft Excel. The interpretation of textual data was later extracted into a Microsoft Word document. Two authors independently conducted the literature search and identified ci-

tations for cervical cancer prevention and its challenges. Following the application of the inclusion and exclusion criteria, full-text articles were identified and evaluated for eligibility. Finally, these publications were analyzed as part of the synthesis.

Results

The cost-effectiveness of prevention strategies

The studies report an association between HPV and cervical cancer, since 73 of 100 cervical cancer patients tested positive for HPV and 27 tested negatives (75). In addition, a reduction in mortality and an improved cost-effectiveness ratio occurs following screening implementation and the HPV test (starting at the age of 30-35 yr and repeating it at intervals of 5–10 yr), respectively (76)

Regarding vaccination, HPV vaccination is cost-effective in Iran. Some studies reported that the quadrivalent vaccine has a higher cost-benefit ratio compared to the bivalent vaccine in Iran. However, it is important to consider other factors, such as vaccine efficacy and coverage rates, when making decisions about vaccination strategies in the country (48, 77).

Screening participation and its factors affecting

Less than half of Iranian women had a Pap smear, and the majority of women did not repeat the Pap smear at standard intervals (28, 40, 55). The most common motivating factors for screening participation and screening barriers are mentioned in Fig. 2 and 3 (7, 10, 11, 13, 18, 20, 28, 29, 31, 35, 38, 39, 49, 50, 53, 55, 56, 58, 71). Based on this information, there is a connection between education and age and women's knowledge of cervical cancer. This relationship could increase the number of women screened (49, 53). Most studies, however, discovered an inverse relationship between performance (screening participation) and employment, age, residence, and education (7, 11, 41). The impact of socioeconomic conditions and low awareness were common factors in this study and other studies that examined the challenges and barriers to screening participation (22, 23). Furthermore, while women had a positive attitude towards Pap smears, their knowledge of Pap smears and, more importantly, their participation in screening was poor (10, 11, 14, 35, 38-40, 50, 53). In contrast, while women's knowledge of Pap smear tests was adequate, their knowledge of HPV was not (58). In regard to vaccinations, the most common reasons for low vaccine participation were a poor knowledge of the vaccine's benefits, the vaccine's preparation method, and concerns about the vaccine's side effects (57). In general, inadequate knowledge of screening test, education, and level of awareness were the most important factors in not performing Pap smears, particularly among rural women (11, 19, 20, 28-31, 33, 35, 37, 40, 44, 45, 49, 51, 54-56, 58, 63, 71).

Cervical cancer prevention and its risk factors

According to the Iranian Cancer Research Center, HPV types 16, 18, and 31 are the three most common types of HPV in Iranian women. The most important risk factors for this disease in Iran are mentioned in Fig. 2 (72).

There was a significant relationship between individuals' attitudes and awareness and marital status, so that single people had a more positive attitude and lower awareness of cervical cancer than married people (11). Other research has found a link between HPV training programs in basic sciences and internships (such as virology) and increased awareness (57). In contrast, Pourkazemi et al. showed the opposite result (53). In addition, some problems affecting the prevention of sexually transmitted diseases (STDs) have been identified (Fig.2) (62).

The problems in the individual and social, as well as the health system dimensions, were discovered in another study conducted into the challenges of providing prevention programs in Iran. Their components are listed in Fig. 2 (22).

In the majority of studies, mean scores of perceived sensitivity and severity of cervical cancer complications and perceived benefits and barriers

of Pap smear performance, as the most important predictor of behavior, have increased in the experimental group compared to the control group after the intervention (19, 20, 33, 54). Moreover, in other studies the mean scores of knowledges and attitude before and after health education were significantly different (20, 30, 63). However, there have been no significant differences in mean performance scores before and after health education (29, 30, 63).

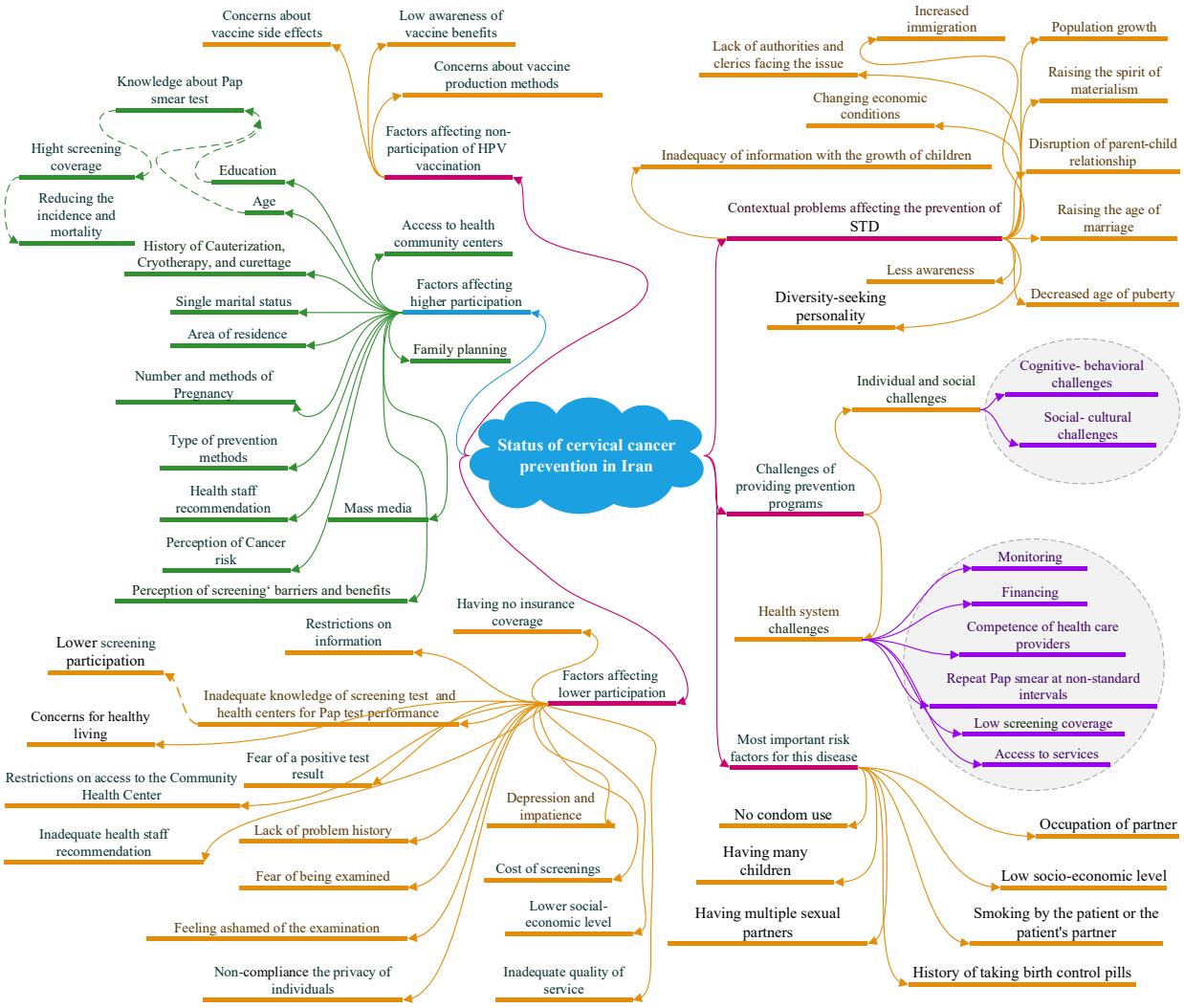

Fig. 2: Visual map of Status of cervical cancer prevention in Iran. The six dimensions are represented by blue and pink text. Related ideas have been clustered together and then linked to main themes (Orange text) and dimensions (blue and pink text)

Discussion

One of the most important implementations of this study is the impact of maternal mortality and disability on child survival, family, and community development, as the most important of the country's development indicators, and the positive and significant relationship between the treatment of precancerous lesions of the cervix with premature delivery and low birth weight (16, 25, 68). In order to identify challenges, previous

programs should be assessed after identifying three decades of cervical cancer in Iran. Therefore, it is necessary to consider solutions with the aim of resolving these challenges.

There is often no well-organized screening program in some low- and middle-income countries; therefore, patients with cervical cancer are commonly detected when it is already advanced (4). In Iran, classified as a low-middle income country, most studies indicated that public knowledge, public awareness, and education, as well as cultural and social issues, about screening tests were the most important factors in Pap smear performance (11, 19, 20, 28-31, 33, 35, 37, 40, 44, 45, 49, 51, 54-56, 58, 63, 71). Moreover, a lower social-economic level, the cost of screenings, and changing economic conditions were financing challenges in Iran (7, 10, 11, 13, 18, 20, 28-31, 35, 38, 39, 49, 50, 53, 55, 56, 58, 62, 71).

Some studies have found an insufficiency of public awareness and the inadequacy of public awareness about location and how to perform the test (15, 24, 27, 32, 34, 36, 42, 45, 52, 59-61). Other studies, including the WHO research, have also shown weaknesses in financial systems (21, 22, 32, 69, 70). In other words, financial resources had a significant effect on changing risk factors for cancer, the choice of new screening procedures, and eventually the coverage of screening programs (47, 67).

Furthermore, the monitoring (22), and authorities, and clerics facing the prevention of STDs (62) were another identified challenge in cervical cancer screening. Numerous studies have shown the challenges of monitoring technical systems (17, 22, 26, 36). This is notable because, using post-implementation research, the level of satisfaction, coverage, and incidence can be measured. This research's findings can be useful in modifying prevention programs and, consequently, lowering incidence and, consequently, mortality rates. The findings of Karin et al. confirm operational research challenges, including effectiveness and qualitative research in cervical cancer prevention programs (26). Moreover, some study findings found challenges in inadequate knowledge of at-risk groups, insufficient reporting and feedback between administrators and service providers, and inadequate access to screening data (9, 46).

Consequently, the most important priorities for improving cervical cancer screening program in Iran include increasing education; increasing service accessibility; expanding screening programs; improving insurance coverage; establishing a control protocol for follow-up; establishing an opportunity system; and improving public awareness have been identified (44). HPV vaccine was reported cost-effectiveness in Iran. To reduce the cost of organizing service-related programs, integrating the vaccination program into school-based health programs may be efficient.

Given the challenges mentioned above, some solutions and the following strategies to improve cervical cancer screening programs in Iran and worldwide are suggested (Fig. 3). Suggested strategies will be based on four dimensions: improvement of knowledge, advocacy and partnerships, screening coverage, and financial mechanisms (3, 12, 15, 19, 21-24, 26, 27, 32, 36, 42, 43, 45, 47, 48, 52, 59-61, 64, 65, 67, 70, 73, 74). Additionally, effective advocacy campaigns can raise awareness about the importance of early detection and encourage individuals to participate in screening, further contributing to the reduction of the incidence and mortality rates associated with this disease.

One strength of this study is its comprehensive approach to examining cervical cancer prevention challenges both in Iran and globally. By considering a wide range of factors, the study provides a holistic understanding of the topic. However, a weakness of the study lies in its heterogeneity in risk bias assessment, which may have introduced some inconsistencies in the findings. Despite these limitations, this research serves as an important foundation for future studies to further explore and address the remaining questions in cervical cancer prevention.

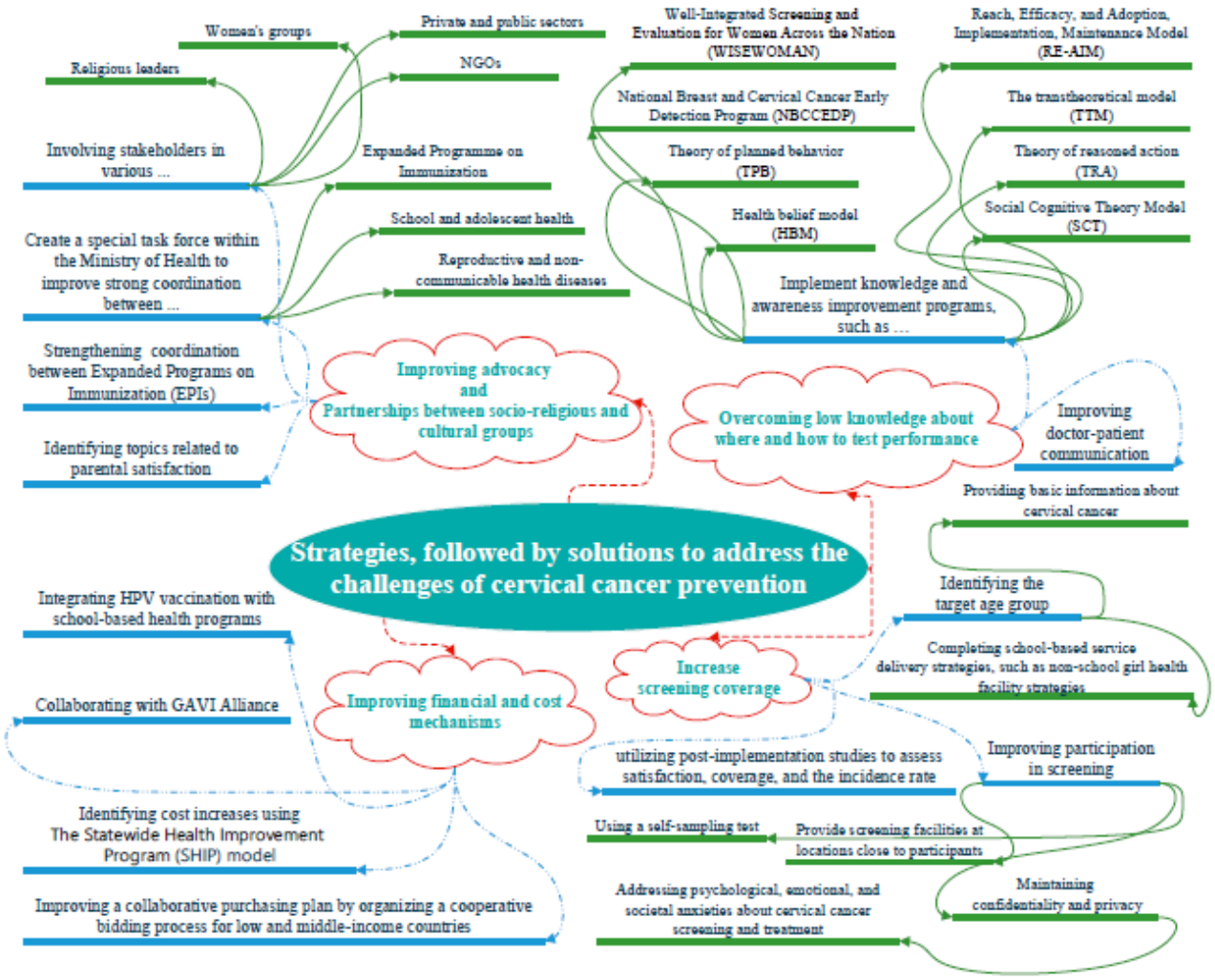

Fig. 3: Visual map of strategies to address the challenges of cervical cancer prevention. The four dimensions are represented by cloud shapes with green text. Related ideas have been clustered together and then linked to main themes (blue text) and cods (green text). Dash lines denotes themes (- - - - -), and subthemes (-... -... - ... - ...) and Full Line as cod

Conclusion

The cervical cancer screening program in Iran is not optimal and could be improved. Lower socioeconomic status, insufficient knowledge of screening tests, and health centers with poor Pap test performance all lead to poorer outcomes, such as lower screening participation or coverage, particularly in rural or remote areas. We will get closer to the WHO's goal of eliminating cervical cancer by increasing education and service accessibility, expanding screening programs, raising public awareness, improving insurance coverage, and establishing a global control protocol for follow-up.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

We would like to thank all the deputies, heads of educational and medical centers, faculty members, experts and health donors who helped us in compiling this collection. There was no financial support in the design of the study, data collection, and analysis.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Bray F, Ferlay, J, Soerjomataram I, Siegel RL, Torre LA, Jemal A (2018). Global Cancer Statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. as part of IARC's Global Cancer Observatory. 2018 edn. WHO, *CA Cancer J Clin*, 68(6):394-424.
2. WHO. Early Diagnosis and Screening [Internet]. WHO. 2018 [cited September 24, 2019]. Available from: https://www.who.int/cancer/prevention/diagnosis-screening/cervical-cancer/en/.
3. WHO. Global Health Observatory data repository, By category, Noncommunicable diseases,Mortality, Risk of premature death from the four target NCDs, Data by country, Global Health Observatory visualizations, Cervical cancer screening. [Internet]. Geneva: WHO; 2016 [updated 2019. Available from: http://apps.who.int/gho/data/node.wrapper.imr?x-id=3354
4. IARC. World cancer report 2008 [Internet]. IARC Press. 2008 [cited March 6, 2019]. Available from: https://publications.iarc.fr/Non-Series-Publications/World-Cancer-Reports/World-Cancer-Report-2008.
5. Mousavi S (2006). Mousavi, SM. Comprehensive National Cancer Control Program in the Islamic Republic of Iran. 2015 edn. Ministry of Health and Medical Education, Deputy of Health, Disease Management Center, Cancer Office, Tehran.
6. Khorasanizadeh F, Hassanloo J, Khaksar N,et al (2013). Epidemiology of cervical cancer and human papilloma virus infection among Iranian women - analyses of national data and systematic review of the literature. *Gynecol Oncol,* 128(2):277-81.
7. Amin R, Kolahi AA, Jahanmehr N, Abadi AR, Sohrabi MR (2020). Disparities in cervical cancer screening participation in Iran: a cross-sectional analysis of the 2016 nationwide STEPS survey. *BMC Public Health,* 20(1):1594.
8. Moher D, Altman DG, Liberati A, Tetzlaff J (2011). PRISMA statement. *Epidemiology,* 22:128.
9. Abdullahi LH, Hussey GD, Wiysonge CS, Kagina BM (2020). Lessons learnt during the national introduction of human papillomavirus (HPV) vaccination programmes in 6 African countries: Stakeholders' perspectives. *S Afr Med J,* 110(6):525-531.
10. Abedian Z, Dar Mohammadi M (2013). Survey of knowledge, attitude and practice of women referring to health centers in Mashhad about Pap smear in 2009. *Iranian Journal of Obstetrics, Gynecology and Infertility,* 15:22-28.
11. Ahmadi R, Karimi Harouni R, Aflak Sir AA (2017). Evaluation of knowledge and attitude of women employees in Shiraz about cervical cancer and Pap smear test. The 4th International Conference on Recent Innovations in Psychology, Counseling and Behavioral Sciences, undefined,
12. Ahmadipour H, Sheikhizade S (2016). Breast and Cervical Cancer Screening in Women Referred to Urban Healthcare Centers in Kerman, Iran, 2015. *Asian Pac J Cancer Prev,* 17(S3):143-7.
13. Akbari H, Jedi Arani T, Gilasi H, et al (2014). Study of motivational factors and causes of nonparticipation to breast and cervical cancer screening tests among women attending health centers in Kashan city. *Journal of Ilam University of Medical Sciences,* 22:137-148.
14. Alam M, Mohammad Alizadeh S, Aflatonian MR, Azizzadeh Forouzi M (2007). A survey of knowledge, attitude and practice of health workers in Kerman province in the field of Pap smear test. *Medical Journal of Hormozgan* 10:379. [In Persian].

15. Allahverdipour H, Emami A (2008). Perceptions of cervical cancer threat, benefits, and barriers of Papanicolaou smear screening programs for women in Iran. *Women Health,* 47(3):23-37.
16. Amarin Z, Khader Y, Okour A, Jaddou H, Al-Qutob R (2010). National maternal mortality ratio for Jordan, 2007–2008. *Int J Gynaecol Obstet,* 111(2):152-156.
17. Arrossi S, Paolino M, Sankaranarayanan R (2010). Challenges faced by cervical cancer prevention programs in developing countries: a situational analysis of program organization in Argentina. *Rev Panam Salud Publica,* 28(4):249-57.
18. Ashtarian HP, Mirzabeigi EB, Mahmoodi EB, Khezeli MP (2017). Knowledge about Cervical Cancer and Pap Smear and the Factors Influencing the Pap test Screening among Women. *Int J Community Based Nurs Midwifery,* 5(2):188-195.
19. Bahmani A, Baghianimoghadam MH, Enjezab B, Mazloomy Mahmoodabad SS, Askarshahi M (2015). Factors Affecting Cervical Cancer Screening Behaviors Based On the Precaution Adoption Process Model: A Qualitative Study. *Glob J Health Sci,* 8(6):211-8.
20. Bakht R, Shabairi F, ghodratollah r, Fakuri E (2016). The factors affecting cervical cancer screening among addicted women of Hamedan in 2015: On the basis of Protection Motivation Theory model. *Jorjani Biomedicine Journal,* 4:68-80.
21. Batson A, Meheus F, Brooke S (2006). Chapter 26: Innovative financing mechanisms to accelerate the introduction of HPV vaccines in developing countries. *Vaccine,* 24 Suppl 3:S3/219-25.
22. Bayrami R, Taghipour A, Ebrahimipour H (2014). Challenges of providing cervical cancer prevention programs in Iran: A qualitative study. *Asian Pac J Cancer Prev,* 15(23):10071-10077.
23. Bayrami R, Taghipour A, Ebrahimipour H (2015). Personal and socio-cultural barriers to cervical cancer screening in Iran, patient and provider perceptions: a qualitative study. *Asian Pac J Cancer Prev,* 16(9):3729-34.
24. Daryani S, Shojaeezadeh D, Batebi A, Charati JY, Naghibi A (2016). The effect of education based on a health belief model in women's practice with regard to the Pap smear test. *J Cancer Policy,* 8:51-56.
25. De Brouwere V, Tonglet R, Van Lerberghe W (1998). Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialized West? *Trop Med Int Health,* 3(10):771-82.
26. Dochez C, Al Awaidy S, Mohsni E, Fahmy K, Bouskraoui M (2020). Strengthening national teams of experts to support HPV vaccine introduction in Eastern Mediterranean countries: Lessons learnt and recommendations from an international workshop. *Vaccine,* 38:1114-1119.
27. Eghbal SB, Karimy M, Kasmaei P, Roshan ZA, Valipour R, Attari SM (2020). Evaluating the effect of an educational program on increasing cervical cancer screening behavior among rural women in Guilan, Iran. *BMC Womens Health,* 20(1):149.
28. Enjezab B, Faraj khoda T, Mojahed S, Bokaee M (2004). Barriers and Motivators Related to Cervical and Breast Cancer Screening. *The Journal of Shahid Sadoughi University of Medical Sciences,* 12:78-84.
29. Gahremani Nasab P, Shahnazi M, Farshbaf Khalili A, Ganbari S (2014). Factors Related to Cervical Cancer Screening among Women Referring to Health Centers in Tabriz, Iran 2012. *Iranina Journal of Obstetrics Gynecology and Infertility,* 16:15-24.
30. Ghahramani M, Alami A, Mohammad Zade Moghaddam H, Moodi M (2018). Screening for Cervical Cancer: An Educational Intervention Based on Transtheoretical Models and Health Belief in Women of Gonabad, Iran. *Iranina Journal of Obstetrics Gynecology and Infertility,* 21:22-32. [In Persian].
31. Ghaoomi M, Aminimoghaddam S, Safari H, Mahmoudzadeh A (2016). Awareness and practice of cervical cancer and Pap smear testing in a teaching hospital in Tehran. *Tehran University Medical Journal,* 74:183-189.
32. Glanz K, Bishop DB (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annu Rev Public Health,* 31:399-418.
33. Hajializadeh K, Ahadi H, Jomehri F, Rahgozar M (2014). The Role of Health Beliefs in Predicting Barriers to Cervical Cancer

Screening. *Journal of Kerman University of Medical Sciences,* 21:416. [In Persian].
34. Hendry M, Lewis R, Clements A, Damery S, Wilkinson C (2013). "HPV? Never heard of it!": a systematic review of girls' and parents' information needs, views and preferences about human papillomavirus vaccination. *Vaccine,* 31(45):5152-67.
35. Jalalvandi M, Khodadoostan M (2005). Married Women And Pap Smear, What They Know? How They Do? *Iran Journal of Nursing,* 18:139-144.
36. Jumaan AO, Ghanem S, Taher J, Braikat M, Awaidy SA, Dbaibo GS (2013). Prospects and challenges in the introduction of human papillomavirus vaccines in the extended middle east and North Africa Region. *Vaccine,* 31 Suppl 6:G58-G64.
37. Kasmaei P, Bab Eghbal S, Atrkare Roshan Z, Estebsari F, Mehrabian F, Karimi M (2014). The effect of health belief model on rural women's Pap smear test. *Nursing and Midwifery Journal,* 12:401-408.
38. Keshavarz Z, Simbar M, Ramezankhani A (2011). Factors for performing breast and cervix cancer screening by Iranian female workers: a qualitative-model study. *Asian Pac J Cancer Prev,* 12(6):1517-22.
39. Keshavarz Z, Simbar M, Ramezankhani A, Alavi Majd H (2012). Factors influencing the behavior of female-workers in the reproductive age regarding breast and cervical cancer screening based on the Integrated Model of Planned Behavior and Self-Efficacy: A qualitative approach. *Journal of School of Public Health and Institute of Public Health Research,* 9:23-36.
40. Keshavarzian K, Barzegari Z (2014). Awareness and practice of women referring to Harris County Health Centers about cervical cancer and Pap smear. *Med J Tabriz Uni Med Sciences Health Services,* 36:70-73.
41. Khojasteh F (2004). Evaluation of knowledge, attitude and practice of women referring to health centers in Zahedan about Pap smear and cervical cancer. *Jundishapur Scientific Medical Journal,* -:1-9. [In Persian].
42. Levano W, Miller JW, Leonard B, et al (2014). Public education and targeted outreach to underserved women through the National Breast and Cervical Cancer Early Detection Program. *Cancer,* 120 Suppl 16(0 16):2591-6.
43. Luciani S, Vardy L, Paci E, Adewole I, Sasco A, Calvacante T (2009). Cancer prevention and population-based screening. *Tumori,* 95(5):597-609.
44. Majidi A, Ghiasvand R, Hadji M, et al (2015). Priority Setting for Improvement of Cervical Cancer Prevention in Iran. *Int J Health Policy Manag,* 5(4):225-32.
45. Majidi A, Majidi S, Salimzadeh S, et al (2017). Cancer Screening Awareness and Practice in a Middle Income Country; A Systematic Review from Iran. *Asian Pac J Cancer Prev,* 18(12):3187-3194.
46. Maseko FC, Chirwa ML, Muula AS (2015). Health systems challenges in cervical cancer prevention program in Malawi. *Glob Health Action,* 8:26282.
47. Moore MA, Eser S, Igisinov N, et al (2010). Cancer epidemiology and control in North-Western and Central Asia - past, present and future. *Asian Pac J Cancer Prev,* 11 Suppl 2:17-32.
48. Nahvijou A, Hadji M, Marnani AB, et al (2014). A systematic review of economic aspects of cervical cancer screening strategies worldwide: discrepancy between economic analysis and policymaking. *Asian Pac J Cancer Prev,* 15(19):8229-37.
49. Onsory K, Zandi G, Abdollahi M, Seyri Foroun Abad M (2014). Knowledge and awareness of Pap smear screening among Parand and Robat-Karim women. *New Cellularand Molecular Biotechnology Journal,* 4:93-98.
50. Pakseresht S, Jafarzadeh-Kenarsari F, Rafat F, Rahebi SM (2016). Exploration of Women's Perspective on Cervical Cancer: A Qualitative Study. *Journal of Holistic Nursing and Midwifery,* 26:43-51.
51. Parsa P, Sharifi F, Shobeiri F, Karami M (2017). Effects of Group Counseling Based on Health Belief Model on Cervical Cancer Screening Beliefs and Performance of Rural Women in Kaboudrahang, Iran. *Asian Pac J Cancer Prev,* 18(6):1525-1530.
52. Pirzadeh A, Mazaheri MA (2012). The Effect of Education on Women's Practice Based on the Health Belief Model About Pap Smear Test. *Int J Prev Med,* 3(8):585-90.

53. Pourkazemi A, Ghanbari A, Fakour F, Ghorbani S (2017). Knowledge and Attitudes of Medical Students Toward Human Papilloma Virus in Rasht, 2013. *Journal of Guilan University of Medical Sciences,* 25:1-10.
54. Rakhshani F, Jalilian F, Mirzaei Alavijeh M, et al (2013). Pap smear test among Women: An Educational Intervention Based on Health Belief Model .*Journal of Birjand University of Medical Sciences,* 20:136-143.
55. Saberi F, Sadat Z, Abedzadeh M (2012). Factors associated with cervical cancer screening and its barriers among women: Kashan, Iran. *Health Monitor Journal of the Iranian Institute for Health Sciences Research,* 11:365-370.
56. Shafti V, Galandari M (2017). Knowledge about Pap smear test, cervical cancer and human papilloma virus among women referred to Gynecology Clinic of Tonekabon Shahid Rajaei Hospital in 2016. *Medical Sciences Journal,* 27:294-300.
57. Shah Hosseini Z, Babapour F (2019). A review of Iranian women's knowledge and attitudes toward human papillomavirus and vaccination against it and its relationship with cervical cancer. (ed)^(eds) 8th National Conference on Health Promotion Strategies and Challenges (Focusing on Cancer), undefined, pp. [In Persian].
58. Sharifi M, Mohammadi Z, Makvandi Z, Rostami P, Moradi A (2018). Assessment of cervical cancer screening and its barriers in 18-50 year old women referring to Asad Abad comprehensive health centers . *Pajouhan Scientific Journal,* 16:35-45. [In persian].
59. Shirazi Zadeh Mehraban S, Namdar A, Naghizadeh MM (2018). Assessment of Preventive Behavior for Cervical Cancer with the Health Belief Model. *Asian Pac J Cancer Prev,* 19(8):2155-2163.
60. Shojaeizadeh D, Hashemi SZ, Moeini B, Poorolajal J (2011). The Effect of Educational Program on Increasing Cervical Cancer Screening Behavior among Women in Hamadan, Iran: Applying Health Belief Model. *J Res Health Sci,* 11(1):20-5.
61. Simbar M, Ghazanfarpour M, Abdolahian S (2020). Effects of training based on the health belief model on Iranian women's performance about cervical screening: A systematic review and meta-analysis. *J Educ Health Promot,* 9:179.
62. Soltanizadeh N, Ameri Shahrabi M, Kavousy E, Hashemi SM (2021). Pathological probing in the health culture focusing on Human Papillomavirus (HPV) diseases. *Pejouhesh Dar Pezeshki (Research in Medicine),* 45:52-59.
63. Tabeshian A, Firozeh F (2009). The effect of health education on performing Pap smear test for prevention of cervix cancer in teachers of Isfahan city. *Medical Science Journal of Islamic Azad Univesity Tehran Medical Branch,* 19:43.
64. Taghizadeh Asl R, Van Osch L, De Vries N, et al (2020). The role of knowledge, risk perceptions, and cues to action among Iranian women concerning cervical cancer and screening: a qualitative exploration. *BMC Public Health,* 20(1):1688.
65. Thulaseedharan JV, Frie KG, Sankaranarayanan R (2019). Challenges of health promotion and education strategies to prevent cervical cancer in India: A systematic review. *J Educ Health Promot,* 8:216.
66. Wang A, Pollack T, Kadziel LA, et al (2018). Impact of Practice Facilitation in Primary Care on Chronic Disease Care Processes and Outcomes: a Systematic Review. *J Gen Intern Med,* 33(11):1968-1977.
67. Wang SM, Qiao YL (2015). Implementation of cervical cancer screening and prevention in China--challenges and reality. *Jpn J Clin Oncol,* 45(1):7-11.
68. Weinmann S, Naleway A, Swamy G, et al (2017). Pregnancy Outcomes after Treatment for Cervical Cancer Precursor Lesions: An Observational Study. *PLoS One,* 12(1):e0165276.
69. WHO (2014). Comprehensive cervical cancer control: A guide to essential practice. (ed)^(eds), 2006 edn. Department of Reproductive Health and Research World Health Organization, Geneva.
70. Wigle J, Coast E, Watson-Jones D (2013). Human papillomavirus (HPV) vaccine implementation in low and middle-income countries (LMICs): Health system experiences and prospects. *Vaccine,* 31(37):3811-3817.
71. Zareai M (2014). Women's knowledge and practice of Pap smear test and barriers to

performing it in Jahrom. *Pars of Jahrom University of Medical Sciences,* 12:37-45.
72. zendehdel K (2013). Compiling a report on cervical cancer prevention status and presenting suggestions and priorities for developing a national cervical cancer prevention program in Iran. Cancer Research Center, Cancer Institute of Iran, Tehran.
73. Kasraeian M, Hessami K, Vafaei H, et al (2020). Patients' self-reported factors influencing cervical cancer screening uptake among HIV-positive women in low- and middle-income countries: An integrative review. *Gynecol Oncol Rep,* 33:100596.
74. Refaei M, Nayeri ND, Khakbazan Z, Pakgohar M (2017). Cervical cancer screening in Iranian women: Healthcare practitioner perceptions and views. *Asian Pac J Cancer Prev,* 18(2):357-363.
75. Keyhani E, Kohannia N, Izadimood N, Keyhkhaee MR, Najmabadi H (2006). The prevalence of human papilloma virus(HPV)in malignant cervical lesion, using multiplex PCR. *Tehran University Medical Journal,*64(3):95-101.
76. Nahvijou A, Daroudi R, Tahmasebi M, et al (2016). Cost-Effectiveness of Different Cervical Screening Strategies in Islamic Republic of Iran: A Middle-Income Country with a Low Incidence Rate of Cervical Cancer. *PLoS One*, 11(6):e0156705.
77. Sargazi N, Takian A, Daroudi R, et al (2022). Cost–benefit Analysis of Human Papillomavirus Vaccine in Iran. *J Prev(2022)*, 43(6):841–57.