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Incidence of Breast and Cervical intraepithelial Lesions: Results of a Screening Program for Women

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ABSTRACT

Background & Objective: Breast cancer is a malignant lesion caused by abnormal changes and growth in breast tissue epithelial cells, including glands, lobules, and larynx. Therefore, the current study's objective was to estimate the incidence of breast and cervical intraepithelial lesions in Iran. This study is based on results from a screening program implemented in the province of Isfahan, Iran.

Materials & Methods: Two stages of cancer screening were performed in the study on over 250000 women in 2018.

Results: As a result of this study, it was determined that in 2018, there was an incidence of 422 benign breast tumors per 100 000 women (95% CI: 393-450). Also, the incidence of breast cancer was 65 (95% CI: 54-76) per 100 000 women, and that of Cervical intraepithelial lesions was 45 (95% CI: 27-63) per 100 000 women in 2018.

Conclusion: This study revealed that breast cancer and cervical intraepithelial lesions are increasing in Isfahan province. Moreover, it was found that screening for these 2 cancers leads to early detection of patients, which results in early treatment and an increase in the 5-year survival rate in these patients.

Keywords: Breast, Cervix, Incidence, Screening

Introduction

Breast cancer is a malignant lesion caused by abnormal changes and growth in breast tissue epithelial cells, including glands, lobules, and larynx **(1)**. The tumor can be benign or malignant. Benign tumors are not cancerous, and their cells appear to be normal. They grow slowly and do not attack adjacent tissues, and do not penetrate other parts of the body. On the other hand, malignant tumors are cancerous. Several factors may cause breast cancer, including age, sex, family history, genetic disorders, physical inactivity, alcohol consumption, tobacco, and oral contraceptives **(1)**.

Cervical cancer occurs in the cells in the lower part of the uterus, which is attached to the vagina. A variety of human papillomavirus (HPV) strains (a sexually transmitted infection), the history of sexually transmitted diseases, smoking, early-onset sex, and multiple sex partners may lead to cervical cancer **(2, 3)**.

More than 2 million new cases of breast cancer were diagnosed worldwide in 2018, and 626 000 women lost their lives to this disease. Moreover, 25.4% of all cancers diagnosed in women and 15% of deaths due to cancer in women are due to breast cancer. This type of cancer has the highest incidence and is the first cause of death due to cancer among women. In Iran, breast cancer accounts for 27% of the total incidence of cancer in women, which is the highest incidence of

cancers, and it is the sixth cause of death due to cancer among women. In 2018, 7% of all cancers diagnosed in women and 7% of deaths from cancer in women were due to cervical cancer. In general, cervical cancer is the fourth most common cancer in incidence and mortality in women worldwide. However, in Iran, the incidence and death rate due to this cancer is lower than the global average, and it accounts for almost 0.83% of the new cases of all cancers diagnosed in women **(4, 5)**.

Screening is referred to all interventions that result in early detection of cancer in people who have no suspicious symptoms but are at potential risk. Screening can be done in moderate and high-risk groups. The necessity of screening services depends on the incidence and prevalence rate of the disease and the financial resources of each country. Furthermore, despite its effectiveness, screening may not be cost-effective. The purpose of the "Early Detection Program" is to establish a care system for early detectable and preventable cancers, primarily based on the early detection of high-risk individuals and, subsequently, organizing community-based screenings.

The Cost-effectiveness of screening for breast and cervical cancer has been reported desirable in several studies (2, 6-10). The results of a meta-analysis during 1960-2014 showed that screening with mammography reduces the risk of death from cancer by 19% and that it is more beneficial in older women **(11)**.

According to regional studies, patients with breast cancer in Iran are at least 10 years younger than the world average(most frequent in 40-49 years), and they find out about their illness when they are in a more advanced stage of the disease **(12, 13)**. There is no routine and regular program for the prevention and screening of cervical and breast cancer in Iran's health system, and screening is done voluntarily. Undoubtedly, planning and policymaking for establishing a consistent national screening program will require conducting studies to assess the current status and identify priorities and high-risk groups in the society.

A screening program for breast and cervical cancers has been conducted as a pilot study in Isfahan province, one of the largest and most populated provinces of central Iran, which can be used by health policymakers to design a screening program at a national level. Therefore, this study was conducted to investigate the incidence rate and the geographical distribution of breast cancer and cervical intraepithelial lesions in Isfahan province.

Materials and Methods

Study Area

The province of Isfahan, located in Iran's central region, has an area of approximately 107 027 sq km (6.57 percent of the country's general area). Around 5.2 million people live in this province, including 2.5 million women.

Isfahan province, in the center of Iran and about 340 kilometers south of Tehran, Iran's capital, was selected as the study location; On the north, Qom, Semnan, and Markazi provinces are neighbors, on the south, Fars, and the east, Yazd, and on the west, Lorestan, Khuzestan, and Chaharmahal (Figure 1).

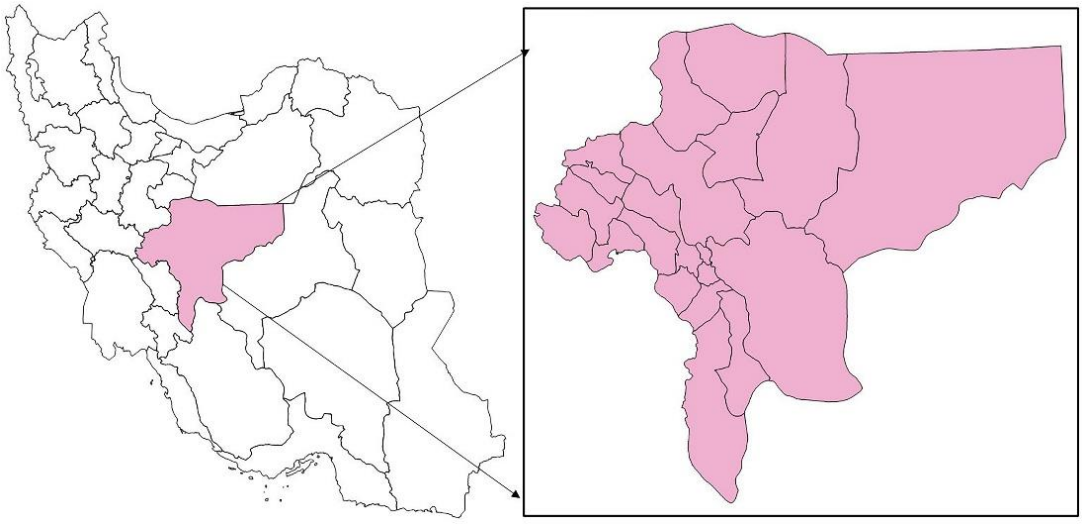

Figure 1. Isfahan location on the map

Screening Program

Approximately 50% of women in Isfahan aged 30-60 years participated in the first step in early detection of breast cancer. Breast cancer screening was conducted by midwives, who conducted clinical examinations and surveyed women about family histories of breast cancer. Further investigation was conducted on those with a family history of cancer or clinical suspicions.

Mammography and biopsy were used as the second step to confirm the benign breast tumor or breast cancer. Fibroadenoma and Cystic Fibrosis were the most common benign breast tumors in pathological findings.

Also, for cervical intraepithelial lesions, all women aged 30-59 years were screened, about 25% of whom participated in the first step of the screening program. They were investigated for HPV DNA testing. Also, Pap smear was another test that was done for them. In the second step, colposcopy and biopsy were used for the final diagnosis.

Statistical Analysis

Microsoft Office Excel was used to estimate the incidence in each county. The geographic distribution of benign breast tumors or breast cancer in every 22 counties was also analyzed using a color spectrum based on quarters. Moran's I and Getis-Ord Gi tests were used to test the incidence variations between provinces and their spatial autocorrelation. The first quarter (Q1) shows the lowest incidence, while the fourth quarter (Q4) shows the highest incidence. An Arc Map 10.2 GIS was used to create the chart. Statistical significance was considered to be less than 0.05.

Ethical Consideration

All of the screening data is stored in Excel files, including the number of screened individuals and the final number of patients identified as having cancer or tumors. There is no individual patient data in there, and all of the data is cumulative. This data was made available to us after an Author (Ms.Ghaderi) contacted and coordinated with the one responsible for the Isfahan Cancer registry (Dr. Ravankhah).

The study's protocol was confirmed in the ethical committee of Mashhad University of Medical Sciences (Ethical code: IR.MUMS.MEDICAL.REC1398.927).

Results

As part of the survey, midwives screened 199 238 of the 398 113 women in the target population (about 50%) for breast cancer family history. The second step of screening was conducted on 14 273 of these women in an effort to confirm the diagnosis of breast cancer and benign breast tumors.

According to mammography results, 841 cases of benign tumors and 130 cases of breast cancer were identified.

According to statistics, the incidence of benign breast tumors in 2018 was 422 (95% CI: 393-450) per 100000 women, and the incidence of breast cancer was 65 (95% CI: 54-76) per 100 000 women. The incidence of breast cancer and benign breast tumors was recorded in Semirom, with the highest case count at 176 cases and the lowest case count at less than 0.1% per 100,000 women in Naeen and Fereydoonshahr.

The highest incidence of benign breast tumor was reported in 2749 cases in Ardestan, and the lowest incidence in Fereydoonshahr and Khasnar, with less than 0.1 per 100000 women. Data of 2 counties were not available, shown by white color on the geographical map (Figure 2).

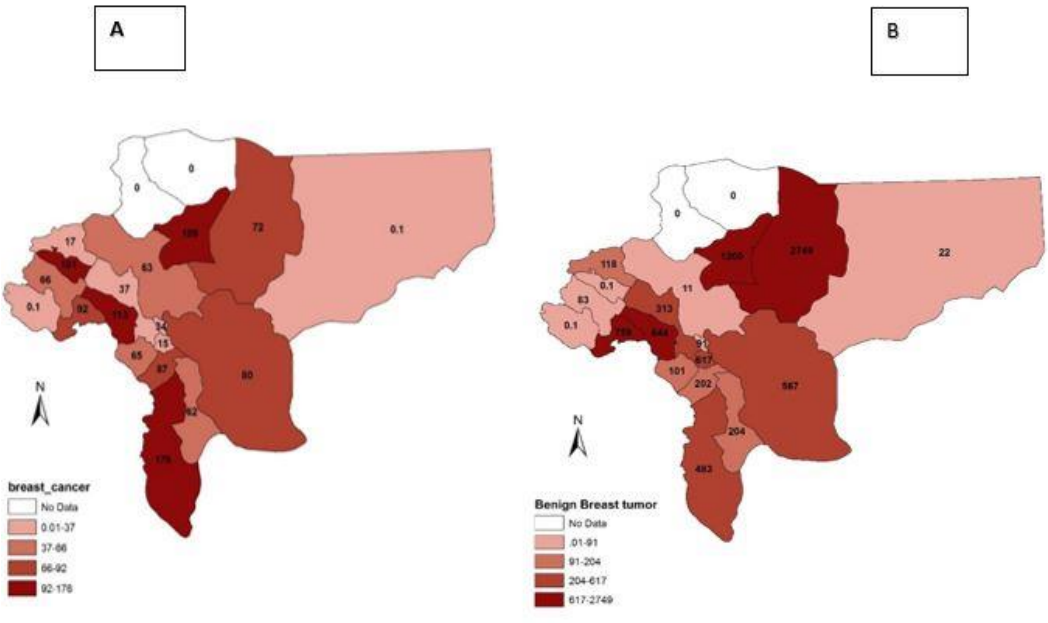

Figure 2. Geographic Distribution of the Incidence of Breast Cancer (A) and Benign Breast Tumor (B) in Isfahan Province, Iran (per 100000 women)

Of 216891 women in the target population, 55 114 (about 25%) were screened for human papillomavirus infection by Pop smear. Those at risk or whose test was positive were referred for further investigation and confirmation.

As a second step of the screening process, 3288 women were screened for each type of intraepithelial lesion.

Finally, 25 cases had cervical intraepithelial lesions, with an incidence equal to 45 (95% CI: 27-63) per 100000, and the highest incidence was reported in Natanz, Ardestan, and Shahreza, with 479 142 and 135 cases per 100000, respectively (Figure 3).

Tests of Getis-Ord Gi and Moran's I were used to compare incidence variations between provinces, and the results did not show a significant difference (P=0.2). The provinces did not cluster together based on their geographic correlation, so no cluster was detected.

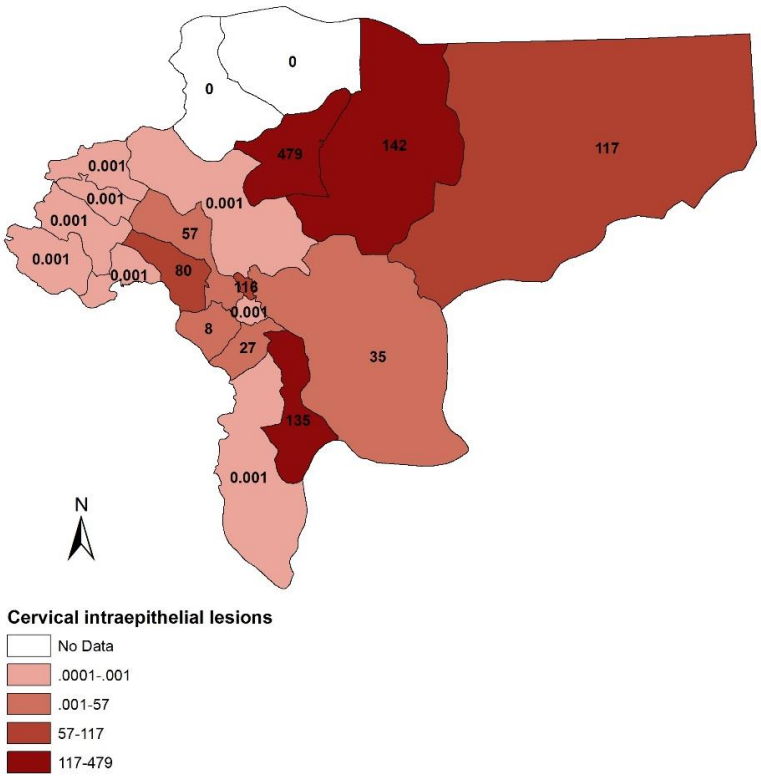

Figure 3. Geographic Distribution of the Incidence of Cervical intraepithelial lesions in Isfahan Province, Iran (per 100000 women)

Discussion

Cancer is one of the most critical health concerns worldwide. Also, breast and cervical cancers are the most crucial type of cancers in women. In Iran, screening programs are being implemented for breast cancer and cervical intraepithelial lesions because of their high incidence.

According to a report released in 2018, in which the incidence of breast cancer in different countries was estimated, it was demonstrated that South-Central Asia had the lowest incidence (25 per 100000 women), and Australia and New Zealand had the highest (94 per 100000 women) **(4)**.

Various studies in Iran reported different incidents of breast cancer. These reports showed an increase in the incidence of breast cancer in Iran. According to a report published in 2011, the incidence of breast cancer had increased from 1980 to 2010 **(14)**. Another study also indicated that the breast cancer mortality rate was increasing in Iran **(15)**. Moreover, studies conducted in Iran have shown that the incidence of breast cancer in Isfahan province has raised from about 40 cases in 2011 to 50 per 100000 women in 2014, indicating an increase in the incidence of this cancer in this province and confirming that breast cancer had the highest incidence between all types of cancers among women in Isfahan province **(16, 17)**.

Several studies have also been conducted on cervical cancer, suggesting that although the incidence of this cancer has been reduced, it is still one of the most important cancers among women worldwide (1916 21/21). A study conducted in some provinces in Iran indicated a low incidence of this cancer. However,

considering the risk factors for this cancer, its incidence may increase in Iran in the future **(18)**.

In Iran, breast cancer is responsible for many years of life lost due to the deaths or disabilities it causes (The DALY for breast cancer in Iran was 4252 years.). It also imposes a substantial economic burden on society and the governments (about 950 million dollars in the USA) **(19)**. In a systematic review conducted in 2013 on the effects of screening programs in different regions around the world, it was proved that the cervical cancer screening program has a protective effect and has ultimately reduced the mortality rate of this cancer among women **(20)**. In another study that investigated the impact of mammography on reducing breast cancer mortality, it was found that screening by this method reduced 19%-37% of the mortality rate of this cancer **(11, 21)**.

According to previous studies, screening for early detection of these 2 cancers in those without clinical symptoms leads to early treatment, increasing the 5-year survival rate and reducing the economic burden imposed on individuals, society, and government.

Moreover, the geographical distribution of the incidence of cancer can help to identify the areas with the highest and lowest incidence. Although the findings have shown no geographical correlation between different cities, identifying these areas may help to discover the pattern of incidence and possible risk factors, such as lifestyle and nutritional pattern.

Conclusion

This study revealed that breast cancer and benign tumors of cervical cancer are increasing in Isfahan province. The results also showed that screening for these 2 cancers leads to early detection of patients, resulting in early treatment and an increase in the 5-year survival rate in these patients.

Acknowledgments

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Authors' Contributions

Seyyed Mohammad Tabatabaei: Contributed data or analysis tools, Performed the analysis, Wrote the paper

Moslem Taheri Soodejani: Conceived and designed the analysis, Contributed data or analysis tools

Hamid Reza Shoraka: Contributed data or analysis tools, Performed the analysis

Marzieh Mahmoodi Manesh: Contributed data or analysis tools, Performed the analysis

Saeid Eslami: Contributed data or analysis tools, Performed the analysis

Azimeh Ghaderi: Collected the data; Contributed data or analysis tools.

Conflict of Interest

The authors declared no conflict of interest.

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