NARRATIVE REVIEW

Breast cancer in Pakistan: Current status of screening, diagnosis, and management - A Review

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Abstract

Pakistan has one of the highest rates of breast cancer in Asia, and the latest demographic trends show that this rate is likely to escalate further. In South Asian women, cultural practices and assumptions play a significant role in their understanding of cancer prevention, emphasising the importance of host country cultures and healthcare systems. Another significant issue is the lack of satisfactory screening modalities and knowledge among healthcare workers, particularly nurses. Exploring these factors in detail is crucial for optimising outcomes and enhancing patient care. The current narrative review was planned to deliver a comprehensive understanding of the various factors that lead to the rising prevalence of breast cancer in Pakistan, and to analyse their potential impact on the screening, diagnosis and treatment of this potentially life-threatening disease. To counter the delayed diagnosis and treatment of breast cancer cases, awareness campaigns and education programmes regarding breast cancer should be conducted at the community and institutional levels.

Keywords: Breast cancer, Pakistan, Screening, Diagnosis, Treatment.

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Introduction

Breast cancer is the most common cancer in women worldwide.[1] In 2022, approximately 2.3 million women were diagnosed with breast cancer globally, resulting in about 670,000 deaths.[2] Despite having a lower incidence rate, Asian countries have a much higher mortality-to-incidence ratio than the Western world.[3] Survival rates in high-income countries have improved with new screening methods and treatments, contrary to stagnant or decreasing rates in low-income countries. These high mortality rates can be attributed to poorly resourced healthcare systems and a rising trend of breast cancer in younger females.

Projections indicate that the annual number of new breast cancer cases in Pakistan is expected to rise to approximately 66,562 by 2050.[4] A multi-country study predicted higher mortality rates in South Asia than East Asia, particularly in Pakistan, Afghanistan and Nepal.[5] This is alarming for Pakistan where the healthcare system is already burdened with high patient flow and understaffed, low-resourced settings.

A study in the northern areas of Pakistan highlighted that the major factors for late presentation included the tendency to seek alternative medicine, and poor healthcare availability.[6] Treatment is multi-modal — chemotherapy, radiotherapy, surgeries and biological agents — but accessibility remains a concern. With over a quarter of Pakistan's population living below the poverty line, access to such care remains limited for many.

The current narrative review was planned to outline and discusses the current status of breast cancer in Pakistan, including factors contributing to delays in screening, diagnosis and treatment, as well as factors contributing to hesitancy around the disease. A thorough literature search was conducted across PubMed Central/Medline, Google Scholar and the Cochrane Library databases to include all the relevant literature.

Prevalence and Demographics

In 2022, breast cancer emerged as the most common cancer in women worldwide, with approximately 2.3 million new cases reported across 157 countries, as per the World Health Organisation (WHO).[2] The rate of incidence is significantly low in women aged <25 years, after which it increases remarkably, with the peak onset ranging at age 40-70 years.[7] Age standardised rate (ASR) of incidence per 100,000 is found to be the highest in developed regions of the world, such as Australia/New Zealand (ASR: 95.5), Western Europe (90.7) and North America (89.4), and the

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lowest in developing regions, such as South Central Asia (26.2), Middle Africa (32.7) and Eastern Africa (33.0). However, women living in emergent nations have 17% higher mortality rates than women living in transition countries (15.0 and 12.8 per 100,000, respectively) due to a lack of access to timely diagnosis and treatment.[8]

Increased incidence in the developed nations is possibly due to reproductive and lifestyle risk factors, like less breastfeeding, use of oral contraceptives, alcohol use and obesity, and higher detection rates owing to increased availability of screening services.[9]

Screening

Although screening cannot prevent the occurrence of breast cancer, it offers individuals the opportunity to have breast cancer detected at an earlier stage, and seek treatment when the chances of survival are greater. The primary objective of screening is to detect cancer at a resectable stage. Screening tests are not diagnostic, but are used to distinguish a group of the population who should undergo additional diagnostic testing.

Common methods include clinical breast examinations and breast self-examinations as well as standard imaging techniques, such as ultrasonography, mammography, magnetic resonance imaging (MRI) and digital breast tomosynthesis. Bilal et al. suggested the possibility of screening from whole blood using Raman spectroscopy as an economical and reliable early detection tool, but more research is needed.[10]

Early detection with mammography has been shown to reduce mortality by up to 40%, in women aged at least 40 years.[11] The American Cancer Society recommends annual mammograms for women aged 45-54 years, and biennial or continued yearly screening for those aged 55 years and older. Women aged 40-44 years may choose to begin screening, and high-risk women should start at 30.[12] Since risk factors vary, Pakistani women aged >40 years should get a mammogram annually to ensure better outcomes.[13]

Diagnosis and Treatment

To confirm a breast cancer diagnosis, clinicians often employ additional diagnostic procedures beyond initial screening. These include trucut biopsy done for a core of specimen, which allows for microscopic evaluation, histopathological grading and immunohistochemistry of the tumour.

Treatment possibilities include surgery, hormonal treatment, radiation and chemotherapeutic agents. The best treatment option depends on factors like stage, mass, metastasis and patient history. Alkylating agents are a class of chemotherapy drugs that can provide temporary symptom relief, extend survival, and, in some cases, achieve remission in cancer patients. Adebayo et al. provided a comprehensive overview of various breast cancer therapies, effectively summarising the evolution of treatment strategies and the significant impact of targetted therapies on clinical outcomes.[14]

Breast Cancer in Pakistan

Breast cancer mortality has declined in many developed countries due to advanced screening programmes and robust healthcare systems, in contrast to developing countries like Pakistan. In 2022, breast cancer was the leading cause of cancer-related deaths in Pakistan, with an increasing number of cases contributing significantly to the overall cancer mortality rate.[15] This rise in prevalence and mortality reflects challenges in early detection and access to adequate healthcare services in the region. Moreover, Pakistan does not have a national cancer registry, and existing data mainly comes from limited regional sources, such as the Karachi and Punjab Cancer Registries.[16] The absence of comprehensive national reporting restricts accurate assessment of cancer incidence, survival and overall disease trends.

According to a study in Southern Pakistan, the median age of breast cancer patients was 48 years, 15% of them had a positive family history, 45.7% were pre-menopausal, and the remaining reached menopause before the diagnosis.[17] Another study in the same region presented similar findings. Out of 120 patients enrolled, 98 were age >40 years. The incidence rate of breast cancer was rarer (5.6%) among women aged <40 years, but was present at advanced stages (stages III/IV). The most prevalent histological subtype observed was invasive ductal carcinoma (IDC) (76.5%), with a breast lump as the most frequent presenting complaint.[18]

Current status

Due to limited screening initiatives in Pakistan, most breast cancer cases are detected through symptomatic associations of the disease or its metastasis. A study at Jinnah Hospital in Lahore (2017-21) found that over half of 471 breast cancer patients received surgery and adjuvant therapy as the initial treatment. The majority underwent mastectomy, with most patients also receiving radiotherapy and chemotherapy. Hormonal therapy was given to patients with oestrogen receptor (ER) or progesterone receptor (PR) positivity.[19]

Breast-conserving therapy (BCT) is standard for invasive breast carcinomas up to 4-5cm, but due to delayed presentation with large size and/or inadequate residual volume of breast tissue, it is not a realistic treatment option for all patients in Pakistan. Moreover, for larger and/or

poorly defined tumours, extended resections can result in a deformed breast; oncoplastic techniques are thus being increasingly incorporated in the management of breast cancer.[20] In a study at a tertiary hospital in Karachi, 95% of the patients achieved an acceptable cosmetic result after level II oncoplastic surgery.[21]

Factors contributing to the development of breast cancer

Breast cancer is a complex disease that arises from a combination of various factors. In Pakistan, BRCA1/2 (BReast CAncer gene 1&2) mutations account for nearly 17% of all early-onset and familial breast cancer cases. Triple-negative breast cancer (TNBC) accounts for approximately 15% of all invasive breast cancers. Interestingly, the vast majority (97%) had a BRCA1 mutation, which is also more frequent in patients with early-onset and familial breast cancer cases, regardless of a positive family history. This indicates that BRCA1 mutations may play a key role in the development of TNBC and early-onset breast cancer in Pakistan.[22]

In addition to genetic factors, other physiological factors such as high serum CA 15-3 (Cancer Antigen 15-3) levels and hormonal imbalances of ER (Estrogen Receptor), PR (Progesterone Receptor) and HER2/neu (Human Epidermal growth factor Receptor 2) are well-known major risk factors in Pakistani women.[23]

Early detection and intervention can improve outcomes for breast cancer patients, and further research is needed to better understand the complex interplay of risk factors and disease development.

Factors contributing to delay in breast cancer screening and diagnosis

Pakistan's breast cancer screening efforts saw significant advancement with the establishment of the Federal Breast Screening Centre (FBSC) in 2015 in Islamabad. From 2015 to 2019, the number of women undergoing mammography at this centre increased dramatically from 39 to 1,403, demonstrating a substantial improvement in access to and utilisation of screening services.

A significant number of women diagnosed with breast cancer through FBSC screening were classified as BI-RAD-1 (Breast Imaging Reporting and Data System Category 1), which is indicative of a negative or normal mammogram, meaning no suspicious findings like masses, asymmetry or calcifications were detected, and the breast tissue is considered healthy.

This underscores the effectiveness of early screening in detecting cancers at less advanced stages. The establishment of the FBSC, therefore, highlights the critical role of organised screening programmes in early cancer detection and improved patient prognosis. In addition to screening, the FBSC also launched multiple awareness campaigns aimed at educating the public about the importance of early detection and regular screenings, which increased the number of women participating in mammography screenings, suggesting a positive correlation between awareness efforts and screening uptake.[24]

Clinical screening is available to only 9.5% of urban and 4.8% of rural women, while radiological services reach just 2.5% and 0.7%, respectively.[16] The majority of primary healthcare facilities and public hospitals in Pakistan lack established cancer screening services.[16] However, South Asian women, including those in Pakistan, experience more barriers to screening. A study emphasised the impact of how cultural practices and assumptions play a significant role in perpetuating this limitation, emphasising the role of host country cultures and healthcare systems in the issues surrounding breast cancer.[25]

Another significant issue is the lack of satisfactory screening modalities at district hospitals and knowledge among healthcare workers, particularly nurses. A survey conducted among nursing staff found that only a few of them had sufficient knowledge of the risk factors and screening modalities for breast cancer. Undoubtedly, improving access to education, awareness, and screening programmes, along with better training for healthcare workers, is critical in reducing the incidence and improving mortality of breast cancer in Pakistan.[26]

Factors contributing to the delay in breast cancer diagnosis

In Pakistan, the average age at breast cancer diagnosis is around 48 years, but patient delays remain a major issue, with an average delay of nearly 16 months. Lack of awareness, use of traditional medicine, faith-healers, misdiagnosis without proper investigations, and social fears — including anxiety about relationships — were key reasons women delayed seeking care. Lower socioeconomic status and advanced disease stage were strongly linked to delays of three months or more.[27]

A study at Jinnah Hospital, Lahore, concluded some patterns surrounding delayed consultation and diagnosis in Pakistan. Women who had a painless lump as the initial symptom showed the longest delay. Furthermore, patients with a lump size of 1-5mm showed a longer median delay in consultation than those with a lump size >5mm.[28] Another study found that married women, uneducated women, and women from low-income households were the subsets that showed longer delays than others.[29] The

lack of awareness about breast cancer and the low literacy rate, in general, are also significant contributors to the delay in diagnosis.

One study identified structural barriers to timely diagnosis, including a lack of finances and receptive medical services. The socio-cultural factors included feminine sensitivity, stigmatisation, and an aversion to male doctors, which prevents women in Pakistan to discuss or report any kind of symptom related to their breasts.[30] Some patients delayed seeking help, while others sought relief from their preferred clergy as the first line of treatment. They believed that their lump would disappear with the recitation of religious verses, and they also had the misconception that cutting the lump for biopsy would cause it to spread more rapidly.[28]

Factors contributing to the delay in breast cancer treatment

There are three major categories of influencing factors that lead to delays in breast cancer treatment in Pakistan: Individual, socio-cultural and structural.

Individual Factors: Inadequate awareness about the budding morbidities of the woman's body is a mere consequence of its objectification. Consideration of breasts as sexual organs, a common perception among the Pakistani population, discourages women from discussing their bodies and sharing their medical issues in the family sphere, which eventually leads to diagnosis in the advanced stage of the disease.[25] According to the data, most women in Punjab suppose cancer is an incurable condition, and thus possess no belief in treatment, assuming that it would unnecessarily increase their pain and cause a financial burden.[30]

Breast cancer patients prefer social isolation in order to avoid judgment from family and other members of their social circle. Negative body image evaluations of physical deformations as a consequence of treatment therapy demoralise patients.[30] Inadequate social and emotional support leaves patients with negative anticipations of medical procedures, and makes it difficult for women to ask for professional help.[30] The overall low literacy rate of Pakistan (50.5%: male 63%, female 38%) also paves the way for misconceptions about the treatment.[31] This leads them to alternate ineffective forms of treatment.

Socio-cultural Factors: The fear of losing femininity associated with physical appearance is one significant factor that demotivates women from opting for advanced treatment to avoid physical impairment, such as hairlessness, skin discolouration, loss of eyebrows and eyelashes, and loss of breast contour due to mastectomy.[6] According to participants of a study, the thought of losing hair and breasts gave them a sense of incompleteness and made them feel uncomfortable about their bodies and sense of self.[32]

Women reported experiencing discrimination at the hands of family and relatives as their bodies were stigmatised and viewed negatively, which created a feeling of unpleasantness.[25] Fear of rejection from their husbands on news of the disease superimposed their already disrupted self-image of worthiness. Many women are hesitant to visit male doctors for treatment as they become deeply uncomfortable at the thought of revealing their breasts for screening and treatment to them.[32] Traditional values and religious principles hold back women from getting breast cancer treatment and consultation from male physicians.

Structural Factors: Cancer management mainly depends upon the availability and affordability of anticancer drugs, demanding a big budget. Government health coverage in Pakistan is, unfortunately, insufficient and apathetic in terms of public health insurance, leaving the majority of the population to bear their health expenses on their own, which is extremely challenging.

Cancer treatment in Pakistan is limited to major cities only, forcing rural patients to travel an average of 300km for treatment, which imposes financial constraints on the families of the patients as they not only have to bear the expenses of treatment, but also of accommodation because appointments and cancer treatment take time.[33] With mass ignorance of health insurance, poverty-stricken patients delay, or simply do not go forward with cancer treatment.

A few other factors that cause a delay in the commencement of therapy include formulary restrictions, actual availability, and inflation and low affordability.[33] Recognising the most vulnerable socio-economic groups with regard to mortality and poor survival will help to redirect focus on more effective medical and social interventions, which could enhance education and awareness, and healthcare access, thus also ensuring timely diagnosis and treatment.[34] Implementation of effective cancer prevention and control programmes in developing countries requires a thorough and deep understanding of the interplay of socioeconomic differences in rising cancer incidence, increased mortality, and poorer survival.

Recommendations

Since breast cancer is a significant health concern in Pakistan, there is a dire need to propose and execute necessary measures to better deal with this growing challenge. To counter the delayed diagnosis of breast

cancer, awareness campaigns and education programmes regarding breast cancer should be conducted at the community and institutional levels. The male population should also be included, as they play an unavoidable role in the social circle of women, and can thus be educated to better support women suffering from breast cancer. Media can also play a vital role in spreading awareness about breast cancer, which can help promote regular self-examination, raise awareness about early warning signs and symptoms, and encourage women to seek medical help sooner. This may contribute to a better understanding that individuals treated for cancer are capable of leading healthy and normal lives.

On a higher level, the government must invest in the healthcare system and provide free or affordable screening and diagnostic services, including mammograms, ultrasounds and biopsies, especially in remote areas of the country.[35] Regular screening should be encouraged or made mandatory, especially for women with a family history of breast cancer, women aged >40 years, and those with abnormal symptoms. Additionally, establishing a national cancer registry is essential to collect reliable data that can guide evidence-based planning and policy-making for breast cancer control.

Furthermore, healthcare stakeholders should address socio-psychological and cultural factors restricting women's access to healthcare. Religious leaders should be encouraged to talk about breast cancer and other prevalent female healthcare issues, which would play an essential role in removing the hurdles related to faith and modesty preservation.

Conclusion

Addressing the delay in breast cancer management can only be achieved through an all-encompassing approach involving increased awareness, strong collaboration among healthcare stakeholders, and necessary policy interventions.

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MFI, RS, AAM, MRH, MAA, AR & SV: Concept, design, drafting, final approval and agreement to be accountable for all aspects of the work.

SURU: Concept, design, revision, final approval and agreement to be accountable for all aspects of the work.