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Review Article

Mammographic screening: Is it relevant to developing countries?

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ABSTRACT

In the First world Mammogram screening for breast cancer is well established, its value, however, continues to be questionable. Multiple recent studies have shown that mammogram screening programs lead to increased costs and unnecessary further testing with no benefit to the patient.

In developing countries clinical breast examination can be equally useful and more cost-effective than mammograms, as shown by Mittra in 1995. Breast cancer presents at a later stage and in the pre-menopausal age group in the developing world. The unreliability of this modality as a screening tool is well recognized in this population thus further questioning its suitability. In many third world countries mammograms are costly and unavailable to the general population thus hindering screening.

The different characteristics of breast cancer presentation in the third world coupled with cost and availability issues suggest that mammographic screening may not be beneficial in developing countries. Financial resources may be better directed to managing other aspects of the disease.

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In 2002, the Pan American Health Organization reported that most breast cancer screening policies in Latin American and the Caribbean are not justified by available scientific evidence and recommended that before further developing screening programmes they should focus on implementing appropriate management guidelines and providing access to diagnostic and treatment services.¹ In 2008, using a Microsimulation Screening Analysis model, Okonkwo et al calculated that, for India, Clinical Breast Examination (CBE) performed annually for women aged 40–60, would be as effective as biennial mammography screening in reducing breast cancer mortality,

while incurring only half the cost. They went on to declare that the estimated cost-effectiveness of CBE screening for breast cancer in India compares favourably with that of mammography in developed countries.² As early as 1995, Mittra of Tata Memorial Hospital Mumbai, India indicated that the effectiveness of physical examination (PE), in the early detection of breast cancer, has been underestimated and suggested that it may be a simple and inexpensive alternative to mammography screening in developing countries.³

There are many reasons why mammography screening may not be cost-effective in developing countries. Some of

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these are: cost, human resource requirements, facilities for mammography, age for screening and availability of other diagnostic modalities such as CBE and ultrasound.

1. Age

In many lower and middle income countries (LMC's) breast cancer presents at a much younger age than in developed countries and it is in this younger age group that mammography is most unreliable. In Turkey, the frequency of breast cancer in women below 40 years is 20% while it reaches 30% in developing Asian countries.^{4,5} In the Caribbean about 33% of breast cancer cases present below age 50.⁶

While screening is often recommended for the 50–70 age groups, this may not be applicable to many developing countries. For example in India, the life expectancy is 62 years and breast cancer peaks among women in their forties.⁷ In Lagos, Nigeria the highest prevalence is in the 26–45 age group and 15% of cases are under age 30.⁸ In Uganda the peak age is 30–39 years and over 75% present with stage III and IV disease.⁹ Recognition of and dealing with this reality is exceedingly important since most breast cancer cases worldwide occurs in developing countries.¹⁰ Thus, the current guideline of mammographic screening from ages 50–70 is not universally applicable and each country must define its own target age group and method of screening.

2. Mammography requirements

The requirements for mammography – equipment, technology, skilled personnel both for radiology and equipment maintenance – limit its widespread use for screening in many developing countries.^{11,12} In one estimation 1.65 mammogram machines per 10,000 women are required for mammogram wait times of 1–4 weeks,¹³ In Uganda, only 4 mammogram machines are available for a 6 million female population; 3 of these are privately owned and tests are too expensive for most women.¹⁴ Similarly in the Indian sub-continent much of health care is delivered through private enterprise leaving screening mammography out of the reach of many patients.¹⁵ Mammographic screening also depends on successful public education which is directly related to literacy and socio-economic conditions; these are not favourable in many LMC's. Compliance and diligent follow-up are also limited among the poor and uneducated.³ The consequences are that very few women get screening mammograms (2% in Opoku's West African Study) and many are lost to follow-up.¹⁶

3. Clinical Breast Examination (CBE)

While CBE has not been demonstrated to be an effective screening tool in the developed world its relevance to LMC must be examined. For example, in India over 70% and Turkey 75% of cases have clinically advanced disease at diagnosis.^{17,18} CBE has potential to lead to earlier diagnosis where most cancers are stage 3 and 4 at presentation.¹⁸ In addition, many

more patients have CBE than mammograms in limited resource settings, and this modality could be utilised more widely.^{16,19} Okonkwo et al calculated that CBE would be a more cost-effective strategy than mammography in India.² Abuidris et al showed that using trained volunteers, CBE can reach low-income rural communities in Africa and result in earlier detection of breast cancer in asymptomatic women.²⁰ Moreover, CBE and breast self-examination (BSE) can be more readily implemented and more easily integrated into the existing healthcare system in LMCs.¹² While CBE and BSE are not regarded as effective screening tools, almost all such data come from developed countries. However, both CBE and BSE are likely to improve outcomes in LMCs where mammography is not readily available and patients present with late stage of disease.²¹

4. Other considerations

Ultrasound has been recommended by some authors as a screening tool where mammography is unavailable or unsuitable (as many patients are under age 40 in LMCs).¹⁴ The equipment is cheaper, portable and technicians more prepared to go to villages. Even in developed countries, an important role of ultrasound screening has been described.^{22,23} Although BSE has been condemned as useless it certainly can improve cancer awareness.²⁴ Many women in LMCs expect the doctors or nurses to do a CBE as part of their routine examination.¹⁹ Health workers should be encouraged to explore this.

Remennick from Israel described a number of specific challenges that militate against early breast cancer detection among immigrant and minority groups.²⁵ He cited fears, myths, socio-economic factors, fatalism, mistrust of the system and even religion – where Muslim women may be reluctant to be seen by male doctors. From Ghana, Opoku et al described the existence of a supernatural explanation for cancer resulting in herbalists, traditional healers and spiritualists becoming important considerations in planning early detection strategies.¹⁶ It is not surprising; therefore, that public education has been described as a key first step in early detection in LMCs.¹¹

It is also important that we remain aware of the persisting controversies concerning mammography, even in developed countries where conditions are more ideal. In 2004, Baum described lead-time bias, length bias and class bias as biases that promote belief in benefits of mammography.²⁶ A Cochrane review concluded that screening mammography is ineffective in reducing deaths from breast cancer.²⁷ In addition, the Canadian National Breast Cancer Screening Study demonstrated an increased mortality among screened women 40–49 years.^{28,29} In the mammography controversy, Colin Begg indicated that population screening is expensive, leads to unnecessary additional testing and increased surgical interventions. He went on to conclude that it is unlikely that new studies will meaningfully improve our knowledge of the pros and cons of mammographic screening.³⁰ In a very recent study (2014) of nearly 90,000 women in the Canadian National Screening Trial, Miller et al concluded that annual mammographic screening has no effect on breast cancer mortality beyond that of breast physical examination.³¹

5. Conclusion

There is probably no cancer screening test that has been as extensively studied as mammography. Yet, after over 40 years, no clear consensus is presented. For policy workers and practitioners in the LMCs it seems unwise to spend limited resources for debatable benefit. In the context of younger age, poor access to care, limited education, fears, myths, lower socio-economic status and cultural factors, LMCs must be creative and individualistic in engaging strategies for early breast cancer detection and treatment. In this context, mammography may be very low in the order of priorities for breast cancer screening.

The answer to early detection and management of breast cancer in the third world may be in educating underserved populations and increase the use of clinical breast examination by adequately trained staff.

Conflicts of interest

All authors have none to declare.

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