

Executive Summary

Early detection and screening of breast cancer (Thrissur)

Background/ Initiatives Undertaken

- A wearable device developed to be used for **early detection of breast cancer in females**, which a mammogram may fail to detect (size less than 1cm and young women with dense breast tissue)
- It causes **no pain or radiation exposure** compared to mammogram
- Women are required to wear the device for only **15-30 minutes**
- The data from the vest is acquired in **data acquisition system**. With **graphical user interface**, doctors can easily see the images and find the abnormality in breast along with the approximate location
- **Accredited Social Health Activist (ASHA)** workers were associated to take this system to community level for initial screening of breast cancer
- The **results can be analyzed by the Public health centre doctors** or any specialized doctors by wireless communication system
- The device is **economical** with approximate cost of development - INR 1.5 lacs
- The device is **easy to use, portable and works on battery**
- The developed breast cancer detecting wearable device can be handled by operators with **basic computer literacy** and **minimum technical training**

Key Achievements/ Impact

- **Mass screening** for breast cancer in females is possible through a low cost device
- Women do not get exposed to any **radiation or pain infliction**
- **For both, thermal sensor device and mammogram**, more than 97% similarity was found in diagnostic results, obtained for **volunteers and patients**

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Background

In India, breast cancer ranks first in occurrence among the various types of cancers found in women. One of every two women diagnosed with the disease lose their life. Early detection of breast cancer can lead to 100% cure but there is lack of technical expertise and existing methods for detection such as mammography, ultrasound scanning etc. are expensive. Procedures, such as mammography, are painful and carry an additional risk of exposure to radiation. Also, inconsistency is observed in early detection of breast cancer among young women. Women have to travel to hospital for screening and privacy is often a major concern.

Approach Adopted

For women with dense breasts or a cancer size less than 1cm, a mammogram fails to provide conclusive results. Hence for such cases, a thermal sensor probe based wearable device which can map breast skin temperature with high accuracy has been developed by C-MET. It is based on rationale that the cancer tissue is at a slightly higher temperature than the normal tissue.

Screening System for Early Detection



Functioning of Device

Women have to wear the device for only 15-30 minutes. 2D analysis software has been developed with graphical user interface which allows doctors to easily view the images and find abnormality in breasts along with the approximate location details. Similar to BIRADS (Breast Imaging-Reporting And Data System) score in the case of mammogram, a scoring system coined as Breast Thermogram Analysis and Reporting System (BTARS) is also incorporated in the analysis system. BTARS can classify abnormality into 5 categories from normal to highly suspicious cases. Women who are screened can then be asked to undergo further diagnostic methods depending upon the level of abnormalities observed.

Organization Structure

This is a joint project between C-MET, Centre for Development of Advanced Computing (C-DAC), Thiruvananthapuram and Malabar Cancer Centre (MCC), Kannur and is funded by MeitY. C-DAC will be developing the data acquisition system for the wearable device and MCC is involved in carrying out clinical trials.

Handholding Support

The system can be operated with minimum training and is user friendly for clinicians. Any Accredited Social Health Activist (ASHA) worker, after training, can take this system to community level for initial screening of breast cancer.

Awareness

Till date clinical trials on more than 200 volunteers and 75 patients have been carried out at MCC using this device and further trials are underway. The Community Oncology Department of MCC is conducting regular cancer awareness programmes in Kerala. In the next phase, C-MET is planning for volunteer trials across India.

Impact

The key outcomes of the project are highlighted below:

- Mass screening is possible through this low cost portable device

- The device ensures privacy and does not cause any pain or exposure to radiation
- The device is economical as the cost of the developed device is Rs. 1.5 lakhs which is 1/100th of the cost of current digital mammogram machines

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