

Background

- Clinical Breast Examination (CBE), the common detection approach utilized in screening programs in limited resource settings, lacks consistent evidence supporting its effectiveness in downstaging disease or reducing mortality rates. Participation rates in existing screening programs are low, due to multiple reasons.
- AI tools have the potential to reduce healthcare disparities through enhanced accuracy, access, and cost-effectiveness. Thermalytix is a non-contact, non-invasive, radiation-free, novel breast screening tool that uses advanced AI algorithms to analyze minute temperature variations in breast thermal scans and indicate likelihood of malignancy.
- A public-private partnership was formed to improve breast cancer screening through a large-scale field study in the state of Punjab, India, using Thermalytix based screening, a digital referral pathway, capacity building of healthcare workers, and awareness generation among public.

- ✓ Symptomatic participants had higher recall rates (7.8%) and PPV (11.3%) compared to asymptomatic participants (1% and 4.3%, respectively). PPV of biopsy recommended was 81.81%.
- ✓ For the 15 cases with information, lesion sizes varied from less than 2 cm to more than 5 cm. In 2 asymptomatic cases, non-palpable lesions were present.

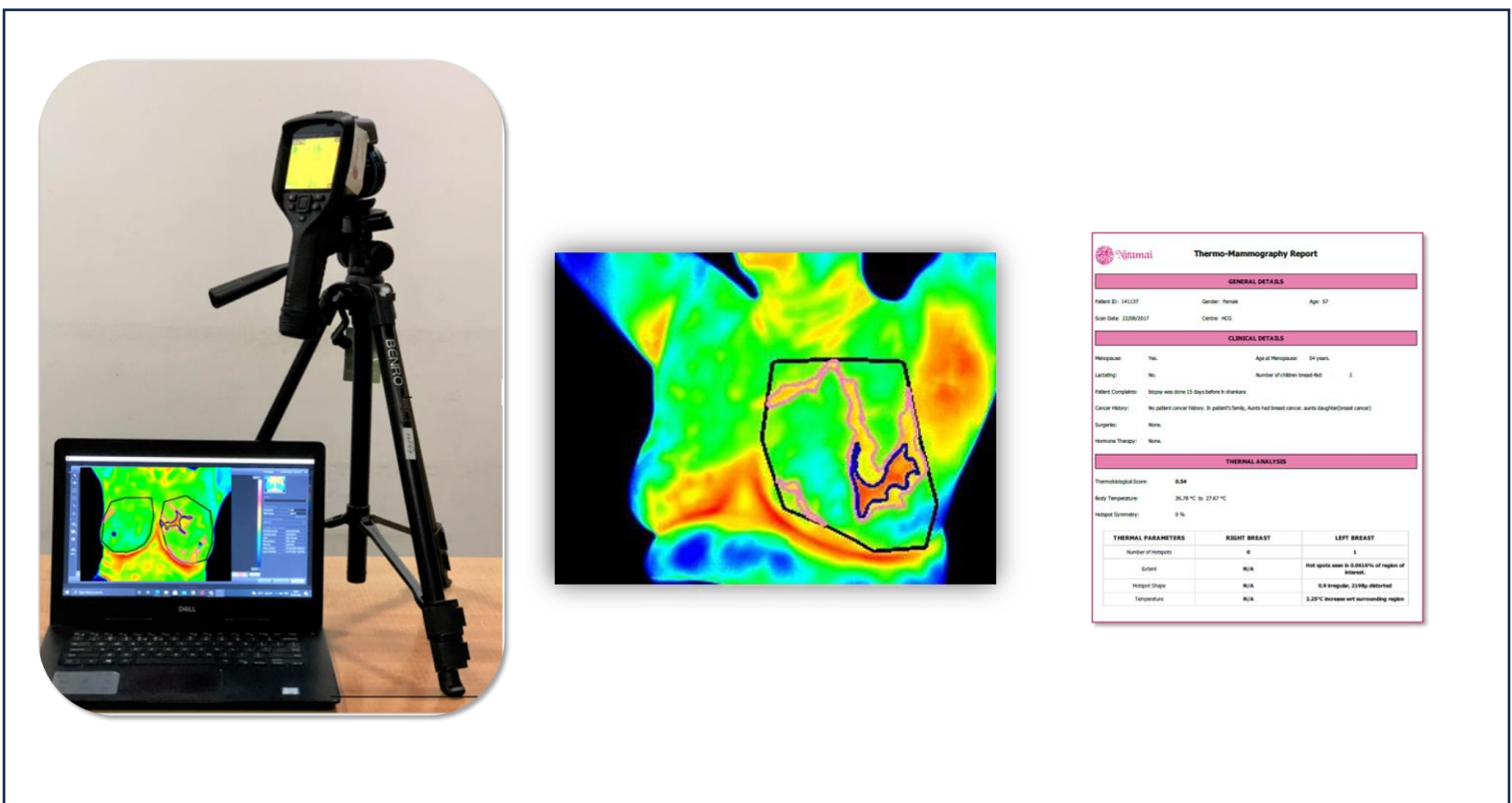


Figure 1: Thermalytix device, and a sample thermal scan and thermo-mammography report with risk scores

Objectives

- To evaluate the effectiveness of Thermalytix for population level breast cancer screening in comparison to the CBE by evaluating the results from an 18-month screening campaign in 23 districts of Punjab.

Methods

- The study used a multi-phased, technology-driven approach to evaluate Thermalytix through weeklong screening programs across 183 locations. In Phase 1, 23,008 Community Health Workers (CHWs) were trained via in-person and online sessions on breast disease, high-risk symptoms, and community mobilization. In Phase 2, technicians captured thermal images of screening participants from five views, which were analyzed by Thermalytix software to assign risk scores. In Phase 3, a digital referral system with patient navigators (PNs) ensured follow-up for high-risk cases, facilitated diagnostics, and linked detected cases to the Punjab cancer registry for monitoring.

Results

- ✓ The study screened 15,069 women using Thermalytix, at a rate of around 800-1000 women per month. The median age was 41, 64.6% were premenopausal, and 69.9% were asymptomatic.
- ✓ Thermalytix triaged 460 women (3.1%) as high-risk, of whom 268 (58.3%) completed follow-up, which was ensured through efforts by PNs.
- ✓ 27 cases of breast cancer were confirmed histopathologically, yielding a crude detection rate of 0.18% (183.21 per 100,000 women) for women over 30.
- ✓ The overall recall rate was 3.1% (460/15069). The positive predictive value (PPV) for recall was 10.1%, rising to 81.8% for biopsy-recommended cases. An adjusted incidence rate (AAI) of 120.94/100,000 was achieved.

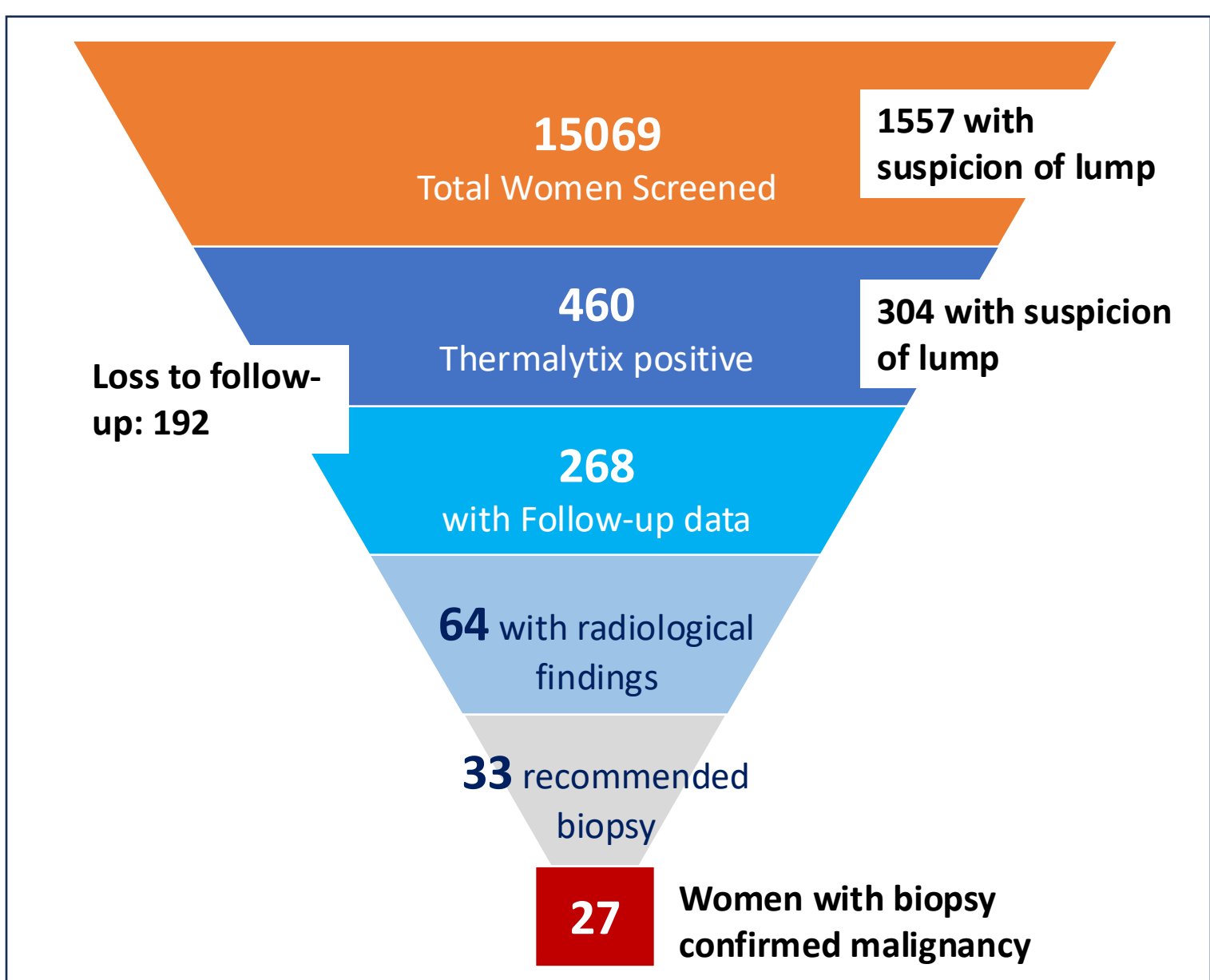


Figure 2: Summary of outcomes from Thermalytix screening

Conclusion

- This screening program achieved two to four times higher cancer detection rates compared to previous CBE based studies.
- Use of AI for image analysis reduced the need for expertise and training of CHWs.
- Statewide scale-up of the program could be achieved due to deployment of digital technologies across all steps – trainings, screening, and referral pathways.
- Expansion of a Thermalytix based screening program may lead to downstaging of disease and reduction of mortality.

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