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Demonstration of PinkDetect: A Digital Solution for Breast Health Awareness and Early Detection

Introduction

In Pakistan, breast cancer poses a severe public health challenge, with one in nine women diagnosed in their lifetime, and a significant 89% of cases detected at advanced stages [1]. This leads to approximately 50,000 deaths annually, highlighting Pakistan as one of the countries with the highest breast cancer mortality rates globally [2]. The factors contributing to these alarming statistics include inadequate awareness, prevailing social stigmas, socio-economic challenges, and limited access to healthcare services, particularly in underserved rural and remote areas [3]. Addressing these issues, PinkDetect employs a technology-driven approach to democratize breast health management. The initiative provides women with critical resources such as educational

content, self-exam simulations, symptom tracking, and connectivity to diagnostic facilities [4]. Evidence from digital health interventions in other chronic conditions, like diabetes and cardiovascular diseases, supports the potential of such technologies to enhance early detection and improve patient outcomes, suggesting that PinkDetect can notably mitigate the impact of breast cancer in South Asia [5]. This paper elaborates on the technology, its impact, and the future directions of PinkDetect, illustrating its capacity to reshape the landscape of breast health management in the region.

Technology

PinkDetect exemplifies a sophisticated integration of technology and cultural awareness to confront the significant challenge of breast cancer in Pakistan. The application delivers interactive guides and localized health communication campaigns through culturally respectful, non-graphic imagery and linguistically accessible content, specifically tailored to the sociocultural context of South Asian women. Additionally, it incorporates a sophisticated symptom tracking and risk assessment tool, enabling users to document their symptoms and access evaluations within the app, as depicted in Figure 1.

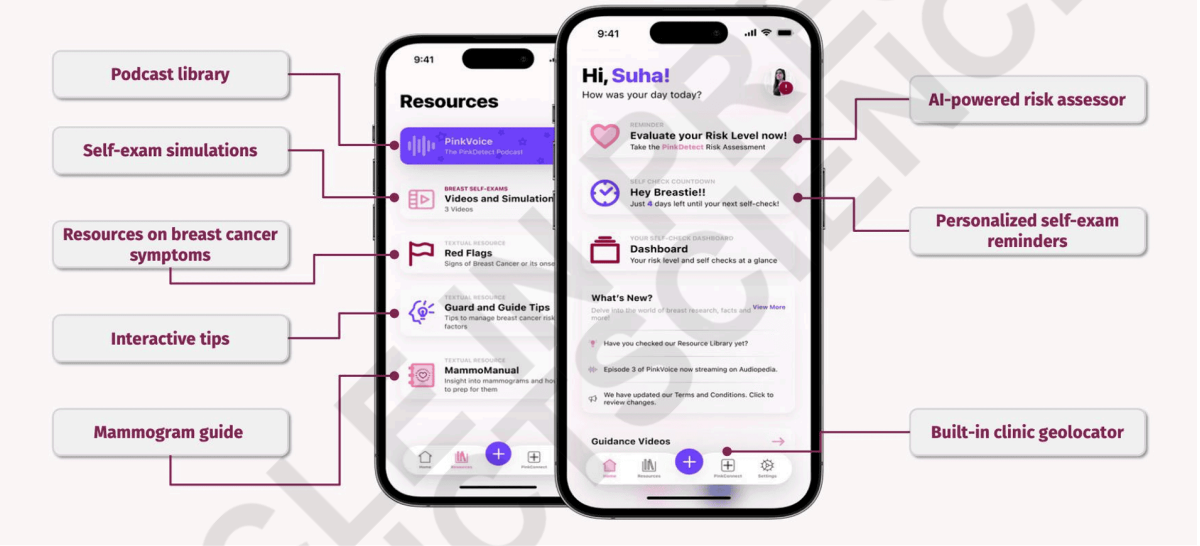

Figure 1 The PinkDetect app interface depicting key features, including an AI-powered risk assessor, self-exam reminders, breast cancer education resources, and a built-in clinic geolocator

PinkDetect also incorporates a diagnostic linkage system that facilitates access to nearby mammography centers and telemedicine services, thereby enhancing access to professional healthcare. A paramount priority is the rigorous maintenance of user privacy and data security, ensuring compliance with international data protection standards. Looking ahead, PinkDetect is set to implement machine learning-driven risk stratification models that will utilize user input and health histories to refine personalized risk assessments. Additionally, enhancements to the PinkConnect API are underway to enable seamless integration with hospitals and diagnostic centers, streamlining the process of scheduling appointments and conducting virtual consultations [6].

Demonstration

PinkDetect's commitment to inclusive healthcare is evident in its meticulously designed user interface and backend analytics that also cater to underserved Latino, African American, Medicaid recipients, and other marginalized populations. Available across major app stores, PinkDetect

ensures broad accessibility, which is critical for reaching these diverse communities. The application's centerpiece, the comprehensive symptom journal, is deliberately tailored to address these groups' distinct healthcare experiences and challenges. This tool empowers users to diligently monitor their breast health by recording even the most minor changes, which is pivotal for communities historically disadvantaged by delayed diagnoses and limited access to timely medical care. To ensure the security of sensitive health data, PinkDetect utilizes advanced cloud-based storage with stringent encryption protocols, maintaining the highest standards of data integrity and confidentiality.

Implementation at community level

PinkDetect’s engagement extends beyond digital interfaces, embedding itself deeply into communities through its grassroots initiatives and advocacy efforts. These programs, which include medical camps and workshops, are designed to empower underserved populations with crucial knowledge and tools for breast health management. Data from these efforts highlight their effectiveness: A Quasi experimental approach was undertaken to gather data regarding our breast health educational sessions. This was carried out at our initial two medical camps. 51 consenting participants agreed to be a part of this pilot. The pre-session survey showed only 30% of attendees reporting any familiarity with breast health practices. Following the sessions, this number soared to 92%, reflecting a robust foundation in breast self-examinations and early detection strategies. This outcome highlights PinkDetect’s role in improving breast health literacy and promoting proactive health behaviors among those most at risk, contributing to greater health equity within these communities.

Since its launch in 2024, PinkDetect has been implemented in real-world settings, reaching over 10,000 women through medical camps, workshops, and focus groups. A pilot program at Jesus and Mary College in India introduced the app to 200 women, while strategic partnerships in Pakistan led to the first breast cancer awareness workshop designed for visually impaired women [7]. To ensure accessibility, the workshop incorporated Braille resources, voice-guided self-exam tutorials, and screen reader compatibility, making the platform more inclusive for visually impaired users.

PinkDetect envisions expanding its reach across Pakistan and beyond, ensuring that women in even the most remote regions have access to vital breast health resources. A major barrier to early detection in rural communities is the limited availability of smartphones and internet connectivity, restricting access to digital health tools. To bridge this gap, PinkDetect collaborates with local NGOs and health workers to deliver in-person workshops, where trained facilitators guide women through self-exams using offline versions of the app. By embedding breast health awareness within households, these efforts empower women with the knowledge and tools necessary for early detection. Looking ahead, PinkDetect plans to integrate advanced large language models to enhance risk assessment capabilities, providing users with more precise and personalized health insights [6].

To date, a total of nine in-person workshops and camps have been held at local sites in the most under-resourced neighborhoods of Karachi, the 12th largest city in the world. During these camps, breast cancer educational workshops were conducted. Free consultations for health issues were offered to incentivize the local communities to attend these camps, led by a team of primary care doctors and medical students. In three of the camps, free medicines and supplements were also provided for the local communities. The broader purpose of these camps was to inculcate health-seeking behaviors, understand the local communities we were aiming to target, and also promote our application.

Future efforts will focus on tracking long-term outcomes to assess whether users receive timely diagnosis and appropriate treatment. These ongoing impact evaluations will drive tangible improvements, including earlier detection, expanded treatment access, and strengthened health equity, solidifying PinkDetect's position as a leader in breast cancer prevention and digital health innovation.

References

1. Sohail, S., & Alam, S. N. (2007). Breast cancer in pakistan—Awareness and early detection. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP, 17(12), 711–712.
2. MENHAS, R., & UMER, S. (2015). Breast Cancer among Pakistani Women. Iranian Journal of Public Health, 44(4), 586–587.
3. Saeed, S., Asim, M. & Sohail, M.M. Fears and barriers: problems in breast cancer diagnosis and treatment in Pakistan. *BMC Women's Health* **21**, 151 (2021). https://doi.org/10.1186/s12905-021-01293-6
4. Tahir, W., Lalani, S., Ebrahimi-Iranpour, S. (2025, February 21). Home. Pink Detect. https://www.pinkdetect.com
5. Ejezie, C. L., Sacca, L., Ayieko, S., Burgoa, S., Zerrouki, Y., Lobaina, D., Okwaraji, G., & Markham, C. (2025). Use of Digital Health Interventions for Cancer Prevention Among People Living With Disabilities in the United States: A Scoping Review. Cancer Medicine, 14(2), e70571. https://doi.org/10.1002/cam4.70571
6. Lalani, S. (n.d). PinkDetect Pitch Deck [Powerpoint Slides]. https://amsafoundation.org/wp-content/uploads/gravity_forms/10-064f01fce81edffc73cd6f84d381f529/2024/12/Latest-Version-of-PinkDetect-pitchdeck.pdf.
7. Agra Taj Camp Highlights. [Video]. PinkDetect. https://amsafoundation.org/wp-content/uploads/gravity_forms/10-064f01fce81edffc73cd6f84d381f529/2024/12/Agra-Taj-Camp-Highlights.mp4