

SYNOPSIS

Submitted to Dr Varsha Tanu

Submitted by Sargam Peshin

TITLE

Market Potential and Adoption Willingness for AI-Enabled Cervical Cancer Screening in India

1. INTRODUCTION

Although cervical cancer is the fourth most common cancer diagnosed and the fourth main cause of cancer mortality among women, according to the Global Cancer Observatory Report of 2022, it is the second most common cancer among females in India, which presents a serious public health concern. (Bray et al., 2022). Cervical cancer typically develops early in a woman's life, often during their most active and productive years. This cancer is most common between the ages of 30 and 34, and again peaking between the ages of 55 and 65 (Kaarthigeyan, 2012)³. High-risk HPV infections are the primary cause of cervical cancer, with HPV types 16 and 18 responsible for 80% of cases in India (Sankaranarayanan et al., 2019).⁴ In 2020, India accounted for 21% of new cervical cancer cases and 23% of cervical cancer deaths globally making it the country with the largest burden of this disease (Muthuramalingam & Muraleedharan (2023)⁵. Despite the availability of effective screening methods such as HPV DNA testing, Pap smear, and Visual Inspection with Acetic Acid (VIA), the uptake remains low, with 1.9 percent in India and particularly in Gujarat where only 0.2% of women have ever been screened (NFHS-5, 2021)⁶. Cervical cancer, often transmitted through sexual activity, faces cultural stigma in India and the issue is compounded by the country's limited resources for testing, and shortage of skilled healthcare personnel. (Think Global ,2023)⁷

The rise of cervical cancer as a significant health concern in India, with over 100,000 new cases each year. Current screening methods (Pap smear, HPV testing) and their limitations in terms of accessibility, affordability, and accuracy. Introduction of AI in cervical cancer screening as an emerging solution that promises to address these challenges.

Importance of Study:

This research aims to explore the potential market for AI-enabled cervical cancer screening solutions in India. It will also evaluate the adoption willingness among gynecologists, as they play a crucial role in decision-making for screening technologies.

Purpose of the Study:

To assess the market demand for AI-based cervical cancer screening and the willingness of healthcare professionals to adopt these technologies in their practices.

To understand the factors influencing their decision-making process, particularly in terms of TAT, quality, and cost considerations.

2. RESEARCH QUESTION

Primary Research Question:

What is the market potential and willingness of adoption for AI-enabled cervical cancer screening in India?

Secondary Research Questions:

What are the barriers to adoption of AI-enabled cervical cancer screening among gynecologists in India?

How do factors such as turnaround time (TAT), accuracy, and cost influence the decision-making process of healthcare professionals?

3. OBJECTIVES

To evaluate the market potential for AI-enabled cervical cancer screening in India, focusing on Tier 1 cities.

To assess the willingness of gynecologists across major cities (Mumbai, Delhi, Ahmedabad, Hyderabad, Pune, Bangalore, Noida) to adopt AI-driven screening technologies.

To identify factors influencing adoption including TAT, diagnostic accuracy, cost, and perceived benefits.

To determine the expected challenges in the market for AI adoption, including resistance from low-risk screening cases and infrastructure limitations.

4. HYPOTHESIS

- Hypothesis 1:
AI-based cervical cancer screening will have a high adoption potential in metropolitan cities.
- Hypothesis 2:
Factors such as the quality of diagnosis, cost-effectiveness, willingness of the doctor and AI's ability to reduce human error will have a more significant impact on adoption than TAT alone.

5. MATERIAL AND METHODS

STUDY DESIGN:

Descriptive Cross-Sectional Study using interviews and surveys to collect data from gynecologists in India.

SETTING:

- Research will be conducted in Tier 1 cities i.e. Mumbai, Pune, Hyderabad, Delhi-NCR and Ahmedabad.
- AI-driven cervical cancer screening technology will be the focal point.

STUDY POPULATION:

Inclusion Criteria:

- Gynecologists practicing in Tier 1 cities.
- Gynaecologists with atleast 5 years of experience.

Exclusion Criteria:

- Gynecologists who are not involved in cervical cancer screening.
- Clinics that do not have access to diagnostic technologies.

STUDY TOOLS: Structured interview with gynaecologists with the help of questionnaire.

SAMPLE SIZE: 61 gynecologists

DURATION OF STUDY: 4 weeks

SAMPLING TECHNIQUE: Convenience sampling of gynecologists practicing in the selected cities.

DATA COLLECTION PROCEDURE:

- In-depth interviews and online surveys will be conducted with gynecologists.
- Data will be collected regarding their experiences with existing screening methods and attitudes towards AI-based solutions.

OPERATIONAL DEFINITIONS:

- Cervical Cancer: A malignant tumor of the cervix, often caused by persistent HPV infection.
- LBC (Liquid-Based Cytology): A method of preparing cervical cells in liquid for clearer, more accurate examination.
- Pap Smear: A screening test to detect precancerous or cancerous cells on the cervix.
- AI-enabled cervical cancer screening: Screening techniques powered by AI algorithms to detect cervical abnormalities.
- TAT (Turnaround Time): The time taken from sample collection to diagnosis.

6. DATA ANALYSIS PLAN

- Software: SPSS (Version 28) for data analysis.
- Descriptive Statistics: Frequencies, percentages, and measures of central tendency to summarize data.
- Inferential Statistics: Chi-square tests and regression analysis to determine factors influencing adoption willingness.
- Chi-square tests will be used to examine associations between demographic variables and knowledge levels attitude and practice.

7. ETHICAL CONSIDERATIONS

Informed consent will be obtained from all participants.

All data will be kept confidential, with patient anonymity ensured.

8. IMPLICATIONS OF RESEARCH

For Healthcare Providers: Insights into factors that could accelerate the adoption of AI-driven cervical cancer screening solutions, leading to improved patient outcomes.

For the Industry: Helps companies to better understand the market dynamics and barriers to adoption in the Indian market, enabling more effective marketing strategies.

9. REFERENCES

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QUESTIONNAIRE

Ask at Reception

1. What are the consulting fees for patients?
2. How many years of experience does the doctor have?
3. How long has the doctor been running this center?

Ask from Doctor:

Cervical Cancer Screening numbers

4. Total # of patients seems per day / week / month
5. What is the volume of cervical cancer screenings performed per week?
6. What methods are used for cervical cancer screening?
7. Reason for using this particular method for screening.
8. What are the costs of these cervical cancer screening methods?

Cervical cancer and PAP Smear

8. How does doctor collect the sample for CC screening?
9. How many PAP smears are performed per week?
10. Does the doctor perform HPV co-testing as well along with PAP or only PAP?
11. Primary reason for screening (from patient's perspective)?
12. Major volume of patients for CC screening is from which age group?
13. What is the doctor's opinion on cervical cancer screening (adequate/not)?
14. Are there any barriers or patient hindrances for cervical cancer screening?
15. In general, how frequently does the doctor recommend CC screening
(Once in ____ Years)
16. What role do you think gynecologists can play a role in increasing cervical cancer screening rates?

17. According to them, what steps can be taken to increase enrolments for CC Screening.
18. Would the doctor be interested in championing / advocating for CC Screening.
19. Does the doctor think that being an active promoter of CC screening would benefit his profile and overall reputation

Advanced LBC Technique

20. Is the doctor aware of advanced LBC techniques?
21. Has the doctor used advanced LBC techniques?
22. According to the doctor, what are the advantages and disadvantages of LBC compared to traditional PAP smear methods?
23. If the doctor starts full steam cervical screening regularly, how many PAP smears will he be able to do daily
24. Would you prefer to partner with a company that is a market leader in cervical cancer screening, which does US FDA-approved cervical screening using AI-based reporting for thin prep smears and US FDA approved mRNA-based HPV testing
25. How likely are you to move away from your preferred lab to a highly specialized cervical cancer screening center
26. How comfortable would you be adopting a pricing structure where you purchase cervical screening tests at Rs 2000 and offer them to your patients at Rs 2500
27. Does the doctor think that this can be an additional lucrative revenue generating workstream for him
28. Do you think your patients will perceive the value of advanced cervical screening technology at this price point?
29. What types of support (e.g., patient education materials, diagnostic tools, operational assistance) would you expect from the company to make this partnership successful
30. Key Reason - if the doctor refuses for the partnership