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Pap Smears a Bridging Tool from the Fields to Lab in Cervical Cancer Screening Camps in Rural India

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ABSTRACT

Cervical cancer is one of the leading causes of cancer-related morbidity and mortality among women in countries like India and south Asian countries due to poor screening facilities Screening programs have shown substantial impact in reducing incidence and mortality; however, their success largely depends on the quality of Pap smear collection, fixation, and interpretation [1]. In low-resource settings like rural parts of India where health facilities are less. Community or field-based screening camps helps to identify the disease in early stages for several technical limitations often compromise smear adequacy and diagnostic reliability. The Pap smear becomes the only test in such settings to identify the disease in the initial stages and to know the disease burden in the rural population.

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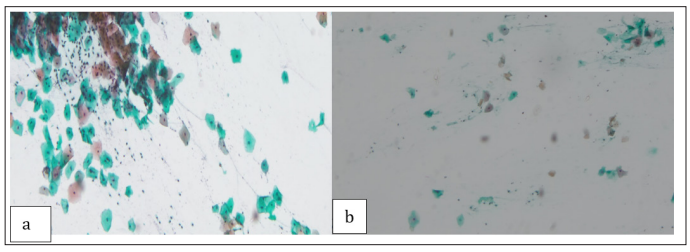
In field conditions, lack of trained personnel, including the site from where sampling has to be done, to preparing smear and putting the sample into fixative where in labs the common issues are air-drying artifacts, thick smears, insufficient fixation, and contaminants due to environmental factors [1,2]. Immediate access to fixatives or cytology slides further compounds the problems in the rural settings. Despite these challenges, with proper planning and simple improvement in the lab essentials will help in the quality of Pap smears and interpretation of the smears. In addition to all relevant clinical details like age, last child birth, history of contraception, oral pills, exact anatomical site and smear and type of device used like non lubricated speculum to be used because lubricant jelly cause artifacts in smear. Powdered gloves can cause artifact in the squamous cells which can look like koilocytes [3,4]. Smears should not be collected after recent history of biopsy. Glass slide, speculum, and spatula should be dry as water and moisture will hamper cellular details [4].

First, rapid wet fixation immediately after smear preparation should be emphasized. A practical approach involves using small, portable jars containing 95% ethanol or commercial cytology spray fixatives, ensuring each smear is fixed within seconds. Second, training of health workers in proper smear spreading techniques can minimize thick areas and overlapping cells. Third, labeling and transport in moisture-proof slide boxes prevent damage during long-distance transit [3,4].

Additionally, the use of visual inspection with acetic acid (VIA) as a preliminary screening tool can complement cytology when laboratory turnaround times are long. VIA-positive cases can be prioritized for Pap smear evaluation, optimizing limited resources. Simple innovations—such as using ethanol-based hand sanitizers as emergency fixatives—have also been shown to yield satisfactory cytomorphological preservation when standard fixatives are unavailable [2,4].

Despite these field constraints, Pap smear remains a feasible and cost-effective screening method when adapted thoughtfully to local realities. The emphasis should be on standardized technique, immediate fixation, and training of frontline health workers. Establishing mobile cytology units or partnerships with regional pathology labs can ensure timely reporting and follow-up [4].



a: NILM Smear

b: Low Cellularity and Mild Drying Artifact in the Smear

In conclusion, overcoming technical limitations in Pap smear collection during screening camps requires a mixture of practical improvisation, awareness, and adherence to basic cytological principles. With these measures, it is possible to maintain diagnostic accuracy even in the most resource-constrained environments—ensuring that the promise of cervical cancer prevention reaches every corner of the community [4].

Conflicts of Interest
None declared.

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