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Visual inspection methods for cervical cancer prevention

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The need for simple, cost-effective screening approaches for cervical cancer prevention in low-resource countries has led to the evaluation of visual screening with 3–5% acetic acid. The low reproducibility and wide variation in accuracy reflect the subjective nature of the test. Pooled sensitivity, specificity, positive and negative predictive values were 80%, 92%, 10% and 99%, respectively, for detecting cervical intraepithelial neoplasia grade 2 or worse lesions. Realistic sensitivity of a quality- assured single visual inspection with acetic acid is around 50%. A single round of visual inspection with acetic acid screening has been associated with a 25–35% reduction in cervical cancer incidence and the frequency of cervical intraepithelial neoplasia grade 2 or worse lesions in randomised-controlled trials. Despite all its limitations, implementing visual inspection with acetic acid screening in low-resource countries may provide a pragmatic approach to building up human resources and infrastructure that may facilitate the highly anticipated low-cost, rapid human papilloma virus testing in the near future.

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Introduction

Cervical cancer is a major public health problem in many developing countries, and the absolute burden will increase in the future if effective prevention measures are not undertaken. The global estimates for cervical cancer burden in the world around the year 2008 indicated that there were 530,232 new cancer cases, 275,008 deaths, with four-fifths of the estimated global burden occurring in the low- and middle-income countries (LMIC) of South and South East Asia, sub-Saharan Africa, and South and Central America.[1] Cytology screening is a time-tested, effective approach to reduce the incidence of cervical cancer through early detection and treatment of high-grade cervical intra-epithelial neoplasia (CIN), particularly CIN 3 lesions.

Regularly repeated Pap smear screening linked with treatment has prevented millions of women from developing cervical cancer in high-income countries with well-equipped and resourced healthcare services.[2,3] Most LMIC in Africa and Asia lack screening programmes. Widespread opportunistic screening and the large-scale national or regional cytology screening programmes in Brazil, Cuba, Costa Rica, Chile, Mexico, among others, in Latin America and the Caribbean have been largely ineffective in reducing the cervical cancer burden compared with high-income developed countries.[4]

The diagnostic and treatment algorithms after a positive Pap smear include three visits for colposcopy, diagnosis and treatment. The sensitivity of a single Pap smear to detect CIN 2–3 lesions ranges between 30 and 60% in most settings.[5–10] Repeated screening at 3–5-year intervals ensure that lesions missed in a given round may be detected in subsequent rounds. Such resource-intensive regimens are not feasible in most LMIC. The low-to-moderate sensitivity and the constraints in implementing and sustaining quality-assured cytology screening in LMIC have led to the evaluation of alternative screening tests such as visual and human papilloma virus (HPV) tests, and new paradigms in low-resource settings.[11–14] Visual inspection with 3–5% acetic acid (VIA) is the most widely evaluated visual test with a large evidence base from a range of field studies in sub-Saharan Africa, China, India, Bangladesh, Thailand, the Philippines and Latin America. Data for visual inspection with Lugol's iodine (VILI) are rather limited. We discuss whether visual screening can be a pragmatic and effective public health approach for cervical cancer prevention in LMIC by reviewing the feasibility, acceptability, safety, accuracy, efficacy and cost-effectiveness in preventing cervical neoplasia.

New screening paradigms

In recent years, new paradigms have been proposed to maximise participation of women in screening and treatment, cost-effectiveness and efficiency of screening and treatment in low-resource countries.[15] These include a low-intensity screening involving a single screen targeted at women aged 30–59 years or 30–49 years[16,17] or screening at 10-yearly intervals, with emphasis on covering a large proportion of targeted women with a highly sensitive test; providing screening, colposcopy, directed biopsies and treatment with cryotherapy or loop electrosurgical excision procedure in one or two sittings[16–18]; and a single visit 'screen-and-treat' approach when screen-positive women, without evidence of invasive cancer, are treated with cryotherapy or cold coagulation, without triaging procedures such as colposcopy and biopsy. 'Screen-and-treat' eliminates investigations to confirm a diagnosis before treatment and minimises loss to follow up, delay in treatment and missed disease.[18–22] A major concern with 'screen-and-treat' cervical cancer prevention strategies is that a large number of women without precursor lesions will undergo cryotherapy or cold coagulation, although available data do not suggest that overtreatment is harmful; on the other hand, it may provide some marginal benefit by protecting women against future HPV infection and by reducing cervical ectopy and targeting the transformation zone where cervical neoplasia occur.[23,24] Current evidence suggests that 'screen-and-treat' interventions are safe, well accepted by women, and are effective in preventing cervical neoplasia.[15,19–24]

Visual inspection with 3–5% acetic acid

Visual inspection with acetic acid involves naked eye inspection of the cervix, using a bright torch light or a halogen focus lamp, one minute after the application of 3–5% dilute acetic acid using a cotton