



Barriers to Cervical Cancer Screening Uptake Among Women in Low-Resource Settings

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Abstract

Cervical cancer remains disproportionately fatal in low-resource settings, where roughly 90% of the disease's global deaths now occur despite the availability of effective, low-cost screening and precancer treatment. This short communication synthesizes recent evidence on why screening uptake stays low across these settings, drawing on cross-national coverage data, primary surveys from Ethiopia and Uganda, a regional meta-analysis among HIV-positive women in sub-Saharan Africa, and the trial literature on HPV-based screen-and-treat and self-sampling. Average effective screening coverage in developing countries is roughly a third of that in developed countries, with the poorest women screened at less than a sixth the rate of the richest. Individual-level barriers, especially the belief that screening is unnecessary without symptoms and outright lack of awareness that screening exists, recur across every setting studied, compounded by structural obstacles such as distance to services and, among HIV-positive women, a distinct fear of an additional stigmatized diagnosis. HPV self-sampling and single-visit screen-and-treat protocols directly address several of these structural barriers and show measurable gains in test performance and participation, but their integration with the trust-building and awareness mechanisms shown to drive uptake remains underdeveloped. Closing the screening gap will likely require pairing these two strands of evidence rather than treating either alone as sufficient.

Keywords: cervical cancer screening; low-resource settings; HPV self-sampling; screening barriers; sub-Saharan Africa

1. Introduction

Cervical cancer remains one of the starkest illustrations of global health inequity in oncology. It is, in principle, one of the most preventable cancers: a slow-growing precursor lesion caused almost exclusively by persistent high-risk human papillomavirus (HPV) infection, detectable years before invasive disease develops, and treatable at the precancer stage with a brief outpatient procedure. In practice, an estimated 662,000 new cases and 349,000 deaths occurred worldwide in 2022, with roughly 90% of deaths concentrated in low- and middle-income countries (LMICs) [1]. That geographic skew has widened even as overall global cancer statistics have shifted, and cervical cancer now ranks among the leading causes of cancer death in women across much of sub-Saharan Africa and parts of South and Southeast Asia [2]. The global burden of women's cancers more broadly has been described as a "grand challenge" precisely because cervical cancer sits at the intersection of preventability and neglect: effective screening and treatment exist, but the health systems, workforce, and outreach infrastructure needed to deliver them at population scale are least available exactly where the disease burden is highest [3].

This short communication synthesizes the evidence on why screening uptake remains so low in low-resource settings, despite decades of investment in visual inspection, cytology, and now HPV-based testing programs. We focus on individual and sociocultural barriers, health-system and structural barriers, and the emerging screening technologies designed specifically to work around those constraints, before closing with the evidence gaps that limit how confidently this literature can be generalized across settings.

2. The Screening Coverage Gap in Low-Resource Settings

The scale of the coverage gap is best captured by Gakidou and colleagues' cross-national analysis of screening coverage in 57 countries, which remains one of the few studies to quantify the disparity directly and comparably across income levels. Using "effective coverage" — a pelvic exam with a Pap smear within the preceding three years — the study found average coverage of 19% in developing countries compared with 63% in developed countries, with a wealth gradient so steep that the poorest women were nearly seven times less likely to have been effectively screened than the

richest (9% versus 64%) [4]. Country-level estimates ranged from as low as 1% in Bangladesh, Ethiopia, and Myanmar to over 80% in Austria and Luxembourg, and within-country wealth gaps persisted even in middle-income countries such as China and Brazil, while India showed uniformly low screening across all wealth quintiles [4]. That last finding is a useful corrective to any assumption that improving national income alone closes the gap: without deliberate screening infrastructure, coverage can remain low even where average wealth is rising.

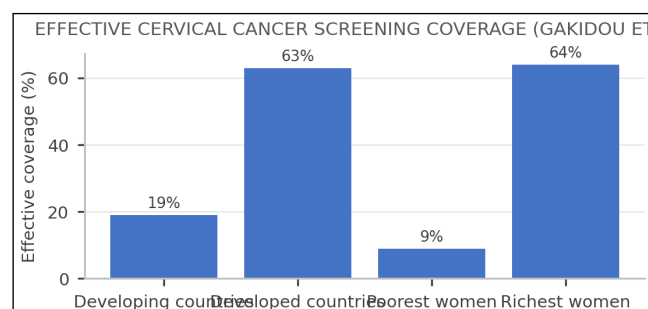


Figure 1: Average effective cervical cancer screening coverage (pelvic exam with Pap smear within 3 years) in developing versus developed countries, and among the poorest versus richest women globally, as reported in Gakidou et al.'s 57-country analysis [4].

Catarino and colleagues situate this gap in the broader arc of screening technology adoption, arguing that cytology-based programs, which required repeated visits, trained cytotechnologists, and functioning laboratory-to-clinic feedback loops, were never realistically scalable in most low-resource health systems, and that the "crossroad" many LMICs now face is choosing among visual inspection, point-of-care HPV testing, and hybrid screen-and-treat models rather than attempting to replicate the high-income cytology pathway at lower cost [5]. Peirson and colleagues' systematic review and meta-analysis of screening modalities likewise found substantial heterogeneity in reported screening performance and downstream outcomes across studies and settings, underscoring that "what works" for screening uptake and effectiveness is not a single universal answer but is conditional on the delivery model in place [6].

3. Individual, Sociocultural, and Awareness Barriers

The most consistently reported barrier across the primary studies synthesized here is simple lack of awareness — not of cervical cancer as a disease, but of screening as an available, asymptomatic-stage

intervention. In Addis Ababa, Getachew and colleagues found that only 25% of eligible women had ever been screened, and among unscreened women, 57% cited the absence of symptoms as their reason for not attending, 56.3% reported not knowing enough about screening, and 42.2% said no screening service was available near where they lived [7]. The "no symptoms, no need" logic recurs across settings and is arguably the single most tractable barrier from a messaging standpoint, since it reflects a specific, correctable misunderstanding of what screening is for rather than a deeper structural obstacle.

Table 1: Reported prevalence of key individual-level barriers to cervical cancer screening uptake across three low-resource-setting studies discussed in this synthesis. [7,8,9].

Barrier	Study / Setting	Reported Prevalence	Notes
Absence of symptoms ("no need to screen")	Getachew et al., Addis Ababa, Ethiopia [7]	57% of unscreened women	Most-cited reason for non-attendance
Lack of knowledge about screening	Getachew et al., Addis Ababa, Ethiopia [7]	56.3% of unscreened women	Closely tied to low perceived susceptibility
Personal perceptions (low risk, no symptoms)	Ndejjo et al., rural Uganda [8]	64.5% of women citing barriers	Largest single barrier category in this cohort
No nearby screening service	Getachew et al. / Ndejjo et al. [7,8]	42.2% / 48.5%	Overlaps awareness and access barriers
Poor knowledge of cervical cancer/screening	Mengesha et al., HIV-positive women, sub-Saharan Africa [9]	Pooled 49% (95% CI 29-68%)	Meta-analysis across multiple countries
Fear of a positive diagnosis	Mengesha et al., HIV-positive women, sub-Saharan Africa [9]	Pooled 18% (95% CI 7-30%)	Compounded by HIV-related stigma

Ndejjo and colleagues' cross-sectional study of 900 women in rural Uganda reinforces this pattern while adding a social-network dimension: only 4.8% of women had ever been screened, and 64.5% cited personal perceptions such as low self-assessed risk or absence of symptoms as barriers, with 48.5% reporting lack of awareness of available services [8]. What stands out in this study is how strongly social and clinical prompting predicted uptake among those who were screened: women who had received a health worker's recommendation were roughly 87 times more likely to have been screened, women who knew where services were offered were about 6 times more likely, and women who personally knew someone previously screened were

roughly 9 times more likely [8]. That gradient suggests awareness barriers are not simply about information deficits in the abstract, but about the absence of a trusted, proximate prompt — a clinician's recommendation or a peer's example — that turns latent awareness into an actual clinic visit.

Mengesha and colleagues' systematic review and meta-analysis of screening uptake among HIV-positive women in sub-Saharan Africa, a population with elevated cervical cancer risk due to HPV-HIV co-infection, found a pooled screening uptake of only 30% (95% CI 19–41%), with wide regional variation from 53% in Western Africa to 16% in Ethiopia [9]. Among the barriers this review quantified, poor knowledge of cervical cancer and screening was reported by a pooled 49% of women, a low personal risk perception ("I am healthy") by 23%, fear of a positive diagnosis by 18%, and fear of the screening procedure itself as painful by 11%, alongside lack of service access, cost, and poor partner support [9]. The review also surfaced a barrier specific to this population: some HIV-positive women described a cervical cancer diagnosis as an unwelcome "additional burden" layered onto an already stigmatized HIV status, a psychological barrier distinct from the general-population literature and one that screening promotion messaging aimed at the general public is unlikely to address on its own [9].

4. Health System and Structural Barriers

Awareness and risk perception are necessary but not sufficient explanations for low uptake, because even motivated women in low-resource settings often encounter a health system that cannot easily accommodate them. In the Ugandan cohort, 16.6% of barriers cited were facility-related — distance to a screening site, cost, and limited service hours among them [8], and Getachew and colleagues' Ethiopian sample independently found that 42.2% of women cited a lack of nearby services as a reason for not screening [7]. Chidyaonga-Maseko and colleagues' review of contributing factors across LMICs synthesizes this structural side of the literature, identifying shortages of trained providers and functioning equipment, weak referral pathways between screening and treatment, and the opportunity cost of travel and lost wages as recurring, cross-country obstacles to program utilization, distinct from and compounding the individual-level awareness barriers documented

elsewhere [10].

Johnson and colleagues' systematic review of implementation strategies for cervical cancer prevention in sub-Saharan Africa takes a program-design lens on the same problem, cataloguing which delivery approaches — mobile outreach, integration with HIV and maternal health services, community health worker involvement, and task-shifting to nurses and midwives for both screening and treatment — have been tested and with what reported success in the region's health systems [11]. Their review is a useful counterpoint to the barrier-cataloguing studies above, because it reframes structural barriers as a set of specific, previously-tested design choices rather than an undifferentiated resource shortage, which matters for what a program planner can actually act on in the near term.

Emerging Approaches: HPV Self-Sampling and Screen-and-Treat

Two technological shifts have directly targeted the structural and access barriers described above. The first is HPV-based screen-and-treat, tested in a landmark cluster-randomized trial by Sankaranarayanan and colleagues in rural India, in which a single round of HPV testing was compared against cytology, visual inspection with acetic acid, and standard-of-care in over 130,000 women; the HPV-tested group showed a significantly lower rate of advanced cervical cancers and cervical cancer deaths at follow-up than the standard-of-care group, establishing HPV testing as an effective single-visit or near-single-visit screening strategy suitable for settings without reliable access to repeat cytology [12]. Denny and colleagues' randomized trial in South Africa complemented this by directly testing screen-and-treat approaches — same-visit treatment following a positive HPV or visual inspection result, without waiting for a separate diagnostic visit — finding that this approach reduced loss to follow-up compared with the conventional screen-refer-treat pathway, a finding directly relevant to any setting where a second clinic visit is itself a major source of attrition [13].

The second shift is HPV self-sampling, which removes the pelvic examination itself as a barrier. Arbyn and colleagues' updated meta-analysis found that PCR-based self-sampling assays performed essentially as well as clinician-collected samples for detecting CIN2+ (pooled sensitivity ratio 0.99, 95% CI 0.97–1.02), though signal-amplification assays performed measurably

worse on self-samples (pooled sensitivity ratio 0.85, 95% CI 0.80–0.89) — a distinction that matters for which HPV test platform a low-resource screening program selects [14]. On the uptake side, the same meta-analysis found that mailing self-sampling kits directly to women's homes produced 2.33 times higher participation than standard clinic-based invitations (95% CI 1.86–2.91), while simply offering women the option to request a kit produced no significant improvement over standard invitation alone (relative participation 1.22, 95% CI 0.93–1.61) [14]. That distinction — passive availability versus active, proactive delivery — is one of the more actionable findings in this literature for low-resource program design, since it suggests self-sampling's benefit for reaching underscreened women depends heavily on distribution strategy, not merely on offering the option.

5. Open Questions and Limitations of the Evidence

Several limitations temper how confidently this evidence base can be generalized. First, heterogeneity across the primary studies is severe: Mengesha and colleagues' meta-analysis of screening uptake among HIV-positive women in sub-Saharan Africa reported I of 100% across pooled estimates, meaning the "30% pooled uptake" figure obscures enormous country- and study-level variation rather than describing a stable regional norm [9]. Second, most of the barrier data synthesized here comes from single-country cross-sectional surveys — Ethiopia, Uganda, and pooled sub-Saharan African cohorts specifically — and direct comparative data across LMIC regions, or between sub-Saharan Africa and South or Southeast Asia, remains sparse; whether the same barrier hierarchy (awareness first, structural access second) generalizes outside the countries actually studied is an open question rather than an established fact. Third, the self-sampling and screen-and-treat evidence, while strong on efficacy and test performance, was generated substantially in trial conditions with dedicated staffing and logistics support; how the 2.33-fold participation gain from mailed self-sampling kits translates to routine low-resource program delivery, where mail infrastructure itself may be unreliable, is not yet well established [14]. Finally, almost none of the studies reviewed here directly link measured barriers to downstream clinical outcomes within the same cohort — barrier prevalence and screening uptake are reported, but linkage to precancer detection rates or mortality

reduction at the population level is largely inferred from separate efficacy trials rather than demonstrated within the same barrier-affected populations [12,13].

6. Conclusion

The barriers to cervical cancer screening uptake in low-resource settings are neither purely a knowledge problem nor purely a structural one; the evidence synthesized here shows both operating simultaneously and often compounding each other, from a woman's belief that screening is unnecessary without symptoms to the practical unavailability of a screening site near where she lives [7,8,4]. Population-specific barriers, such as the additional psychological burden HIV-positive women describe when facing a possible second stigmatized diagnosis, further complicate any assumption that a single awareness campaign or a single service-delivery fix will close the gap [9]. The screen-and-treat and HPV self-sampling literature offers genuine, trial-tested progress against the structural half of the problem, particularly through single-visit protocols and proactive kit mailing that reduce the number of clinic contacts screening requires [12,13,14]. What remains underdeveloped is the integration of these technological fixes with the awareness- and trust-building mechanisms — health worker recommendation, peer example, culturally specific risk communication — that the individual-barrier literature identifies as the strongest predictors of uptake where they are present [8,11]. Closing the screening gap in low-resource settings will most plausibly require pairing the two literatures rather than treating either as sufficient on its own.

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Conflict of Interest

The authors declare no competing interests related to this work.

Data Availability Statement

No new data were collected for this article; all findings discussed draw on previously published studies, which are cited in the reference list and should be consulted for their underlying data.

Ethical Approval

Not applicable. As a literature synthesis, this article did not involve human participants, animal subjects, or primary data collection.

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