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# Availability, Maintenance, and Utilization of Cervical Cancer Screening Guidelines in Level II–V Healthcare Facilities in Tharaka Nithi County, Kenya: A Cross-Sectional Study

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## Abstract

Cervical cancer remains a leading cause of cancer-related death among women in low- and middle-income countries, where screening coverage is critically low and 95% of women have never been screened. Kenya has adopted national and World Health Organization (WHO) cervical cancer screening guidelines, yet the extent to which these guidelines actually reach front-line healthcare facilities, particularly in rural counties, is poorly documented. This study determined the availability, format, maintenance, and utilization of cervical cancer screening guidelines in Level II–V healthcare facilities in Tharaka Nithi County, Kenya. A descriptive cross-sectional survey was conducted among healthcare workers in charge of cervical cancer screening at all 191 Level II–V health facilities offering reproductive health services in Tharaka Nithi County. A census approach was adopted given the manageable population size. Data were collected electronically using a structured questionnaire adapted from the WHO Service Availability and Readiness Assessment (SARA) tool, deployed via Google Forms. Guideline-related indicators included presence of printed or electronic guidelines, guideline type and format, review/update status, staff training or orientation on guideline use, and perceived usefulness. Data were analyzed in SPSS version 29 using descriptive statistics and chi-square tests, with a composite guideline-preparedness variable (available, regularly updated, and rated useful) compared across facility levels. Guidelines were reported available in 57.8% of facilities, most commonly Ministry of Health protocols (71.1%) and, secondarily, WHO guidelines (33.1%); county-specific (7.4%) and internally developed (8.3%) protocols were rare. Where present, guidelines were most often displayed as posters/wall charts (63.6%) rather than printed manuals (19.8%) or digital copies (17.4%). Two-thirds of respondents (66.7%) reported that guidelines were not regularly reviewed or updated, and 80.7% had never received training or orientation on guideline use. Among the 19.3% ever trained, only 5.2% of the full sample had been trained within the past year. Despite these gaps, 66.0% of respondents rated available guidelines as "Very Useful" or "Somewhat Useful." A composite guideline-preparedness indicator was met by only 16.3% (22/135) of facilities overall, with no statistically significant difference across facility levels ($\chi^2(3) = 0.730$, $p = .866$, Cramér's $V = .074$), including a low proportion even at Level V (33.3%, 1 of 3 responding facilities; 3 of the 4 Level V facilities in the county participated). In conclusion, **c**ervical cancer

screening guideline preparedness in Tharaka Nithi County is low and uniformly distributed across facility levels rather than concentrated among lower-tier facilities. The relatively favorable perception of guideline usefulness among those with access indicates that the core deficiency lies in dissemination, currency, and training systems rather than in the content of the guidelines themselves, pointing to the need for county-wide, rather than tier-specific, interventions.

**Keywords**
cervical cancer screening; clinical guidelines; health facility preparedness; Service Availability and Readiness Assessment; Tharaka Nithi County; Kenya.

## Introduction

Cervical cancer is a malignant tumor of the cervix that is typically preceded by pre-cancerous changes caused by persistent infection with high-risk strains of the human papillomavirus (HPV), with types 16 and 18 responsible for approximately 70% of cases globally (Jansen et al., 2020). These pre-cancerous changes are detectable and treatable through screening, making cervical cancer largely preventable (World Health Organization [WHO], 2018). Despite this, cervical cancer remains one of the leading causes of cancer-related death among women, particularly in low- and middle-income countries (LMICs), where access to screening, treatment, and HPV vaccination is limited (Singh et al., 2023). Globally, cervical cancer is the fourth most common cancer among women, with an estimated 662,000 new cases and 349,000 deaths recorded in 2022, over 85% of which occurred in LMICs (Bray et al., 2024; Singh et al., 2023).

In Kenya, cervical cancer ranks second after breast cancer among cancers affecting women and remains a leading cause of cancer-related death, with an estimated 5,236 new cases diagnosed annually (Sung et al., 2021). The WHO's Global Strategy to Accelerate the Elimination of Cervical Cancer, launched in 2020, emphasizes HPV vaccination, high-precision screening, and timely treatment, and screening programs have been shown to reduce cervical cancer incidence and mortality by 41–92% when properly implemented (WHO, 2018; Landy et al., 2016; Jansen et al., 2020). Realizing these gains, however, depends on the extent to which standardized screening guidelines are actually available, current, and used at the point of care, not merely endorsed at the national policy level.

Kenya's Ministry of Health (MOH), through its National Cancer Screening Guidelines (2018) and subsequent updates, recommends HPV DNA testing as the primary screening method, with Visual Inspection with Acetic Acid (VIA) or Pap smear as alternatives where resources are limited, and endorses a "screen-and-treat" approach using same-day cryotherapy or thermal ablation at lower-level facilities. The Kenya Essential Package for Health (KEPH) further defines graduated service expectations by facility level: Level II facilities are expected to provide basic awareness and referral, Level III facilities to offer VIA screening, Level IV facilities to provide screening and first-line treatment of precancerous lesions, and Level V facilities to offer comprehensive services including colposcopy, LEEP, cytology, and histopathology. Despite this comprehensive policy architecture, national screening uptake remains low, with only 16% of eligible women screened by 2015 and only a quarter of surveyed health facilities offering screening services in 2018 (Ng'ang'a et al., 2018; Ministry of Health, 2019).

Evidence from other settings underscores the centrality of guideline availability to screening quality. In Nigeria, Lawson et al. (2023) found profound variation in guideline adherence and equipment availability across public facilities, with lower-level facilities showing consistently weaker preparedness than higher-level ones. In Zimbabwe, Tapera et al. (2021) identified inadequate facility readiness at the primary care level as a critical gap in the national cervical cancer prevention programme, while a cross-country African study by Griesel et al. (2021) demonstrated that facility capacity and guideline adherence are the strongest predictors of whether women receive timely and appropriate management after a positive screen. Nationally, Mwenda et al. (2024) conducted a baseline assessment of cervical cancer screening and treatment capacity across 25 Kenyan counties and identified training and commodity gaps as major constraints on the national programme; Tharaka Nithi County, however, was not among the counties sampled, leaving a gap in county-specific evidence.

Within Tharaka Nithi County, PCEA Chogoria Hospital, an important referral facility serving over 350,000 people, has reported a growing number of women presenting with cervical cancer at advanced stages (Mong'are et al., 2023). Women in the county face long travel distances to Level IV or V hospitals, frequent stock-outs of screening supplies, and encounters with healthcare workers who are untrained or undertrained in screening procedures (Ngari et al., 2021; Mwenda et al., 2024). These challenges are not unique to cervical cancer screening: a county-based doctoral study on hypertension management found that 64.5% of facilities reported unsatisfactory guideline utilization, reflecting a broader pattern of weak guideline dissemination and use within the county's health system (Kameti, 2024). Similarly, Rufo (2019) found that staffing shortages, equipment delays, and irregular supply chains limit health service delivery in Tharaka Nithi County despite devolution of health functions.

Because available studies on cervical cancer screening preparedness in Kenya largely report aggregated national or multi-county data, county- and facility-level disparities in guideline availability remain poorly characterized, particularly for the lower-level facilities (Level II–III) that serve the majority of the rural population. This study addresses that gap by determining, as the first objective of a broader four-part facility-preparedness assessment, the availability, format, currency, and staff utilization of cervical cancer screening guidelines across Level II–V healthcare facilities in Tharaka Nithi County, Kenya.

## Methods

### *Study Design and Setting*

A descriptive cross-sectional survey design was adopted. This design permits data collection from multiple respondent groups at a single point in time and provides a snapshot of current conditions or practices, making it well suited to exploratory and explanatory facility-readiness research (Creswell, 2014; Bhattacherjee, 2012). A comparable design was used by Mwenda et al. (2024) in their 25-county baseline assessment of cervical cancer screening and treatment capacity in Kenya. The study was conducted in Tharaka Nithi County, which borders Embu, Meru, and Kitui counties, covers approximately 2,662 km², and is divided into six administrative sub-counties: Tharaka-North, Tharaka-South, Chuka, Igambang'ombe, Muthambi, and Mwimbi. The county had a total

population of 421,000 in 2024 and an overall poverty rate of 36.1% in 2022. Tharaka Nithi was purposively selected because it presents contextual realities regarding cervical cancer screening that are not captured in existing county-specific literature and was not included in the Mwenda et al. (2024) 25-county assessment.

### *Study Population and Sampling*

The study population comprised healthcare workers in charge of cervical cancer screening (nurses, clinical officers, medical officers, and laboratory personnel) in Level II–V public, private, faith-based, and NGO health facilities offering reproductive health services in Tharaka Nithi County. These workers were selected as the unit of data collection because they are the most knowledgeable informants about the day-to-day operational reality of their facilities, including whether guidelines are accessible and in active use, consistent with the methodology used in comparable national studies (Mwenda et al., 2024; Dhillon et al., 2020). Given that the total population of eligible facilities was known and relatively modest (N = 191), a census approach was adopted, targeting the entire population rather than drawing a probability sample; this eliminated sampling error and allowed findings to represent the full population of Level II–V facilities in the county. The 191 facilities were distributed as 114 Level II, 53 Level III, 20 Level IV, and 4 Level V facilities, stratified across the six sub-counties, with one healthcare worker targeted per facility.

### *Data Collection Instrument and Procedure*

Data were collected electronically using a structured questionnaire adapted from the WHO Service Availability and Readiness Assessment (SARA) tool (WHO, 2018), a validated instrument widely adapted by national ministries of health, including Kenya's MOH, into health facility readiness checklists. The researchers independently adapted the tool by selecting domains and indicators aligned with the study's objectives, guided by Kenya's National Cancer Screening Guidelines (2018), the KEPH facility-level service expectations, and local practice context in Tharaka Nithi County. The adapted tool was converted into an electronic questionnaire (Google Forms) and shared with respondents via email, WhatsApp, or other agreed digital platforms. Respondents were first presented with an informed consent statement, and only those who agreed proceeded to complete the questionnaire, which incorporated skip logic and mandatory fields to reduce errors. Follow-up reminders were sent through phone calls, text messages, or emails to non-respondents, with two reminder rounds conducted before facilities that remained non-responsive were treated as non-participants.

For the guideline-availability objective specifically, the questionnaire captured: (i) whether cervical cancer screening guidelines were available at the facility; (ii) the type of guidelines present (Ministry of Health, WHO, county-specific, or internally developed); (iii) the format in which guidelines existed (printed manual, poster/wall chart, or digital copy); (iv) whether guidelines were regularly reviewed and updated; (v) whether healthcare workers had received training or orientation on guideline use, and, where applicable, how recently; and (vi) respondents' perceived usefulness of the available guidelines. A facility was classified as prepared on this dimension if guidelines were available, accessible to staff, and in active use (Table 1).

**Table 1.**
Measurable Indicator and Preparedness Criterion for the Guideline-Availability Objective

| Objective | Measurable Indicators | Criteria for Preparedness |
|---|---|---|
| To determine the availability of cervical cancer screening guidelines by healthcare facilities in Tharaka Nithi County | Presence of printed or electronic national or other cervical cancer screening guidelines; staff awareness of the guidelines; availability of job aids/posters on screening protocols | Facility is prepared if guidelines are available, accessible to staff, and in active use |

### *Data Analysis*

Data were cleaned, coded, and entered into the Statistical Package for Social Sciences (SPSS) version 29.0. Descriptive statistics (frequencies and percentages) summarized guideline availability, type, format, review status, training coverage, and perceived usefulness. A composite guideline-preparedness variable, defined as guidelines being available, regularly updated, and rated useful, was constructed and compared across facility levels (Level II–V) using the chi-square test of association, with Cramér's V computed to indicate effect size. Findings are presented using frequency distribution tables.

### *Ethical Considerations*

Ethical clearance was obtained from the Institutional Review and Ethics Committees (IREC) of Kabarak University and Tharaka Nithi County, together with a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) and authorization from the County Department of Health. Participation was voluntary and based on full informed consent presented at the start of the electronic questionnaire, with participants informed of their right to withdraw at any stage. Facility names were not collected; facilities were identified only by level to preserve anonymity and confidentiality. Data were stored on a password-protected Google Drive account accessible only to the principal investigator and study supervisors, and all findings are reported in aggregated, de-identified form.

## Results

### *Response Rate and Respondent Characteristics*

Of the 191 questionnaires administered, 135 were completed and returned, yielding a response rate of 70.7%, which exceeds the 70% threshold recommended for social science research and is well above the 50% minimum considered adequate for analysis (Mugenda & Mugenda, 2003). Respondents were drawn from all four facility levels, with the majority practicing at Level II and III facilities, consistent with the county's tiered health system structure. The majority of respondents (68.1%) had 7 or more years of experience in their current position, and 88.1% had 4 or more years of experience, indicating that the data were collected largely from an experienced cohort of healthcare workers well positioned to report accurately on facility preparedness.

Response rates varied by facility level: Level II 70.2% (80/114), Level III 67.9% (36/53), Level IV 80.0% (16/20), and Level V 75.0% (3/4). This differential non-response means that Level IV and V facilities were slightly better represented than Level II and III facilities. Three of the four Level V facilities in the county participated, so Level V estimates rest on very few facilities.

### *Level of Availability of Cervical Cancer Screening Guidelines*

Slightly more than half of respondents, 57.8% (n = 78), reported that cervical cancer screening guidelines were available at their facility, while 31.9% (n = 43) reported that no guidelines existed and a further 10.4% (n = 14) were not sure whether guidelines existed.

### *Types of Guidelines Available*

Among facilities where guidelines existed, Ministry of Health (MOH) guidelines were the dominant reference tool, reported by 71.1% of respondents, consistent with the MOH's role as the primary standard-setter for cervical cancer screening protocols in Kenya. WHO guidelines supplemented MOH guidance in about a third of facilities (33.1%), suggesting partial alignment with international screening standards. Of the 121 respondents who knew their facility's guideline status, 27 (22.3%; 20.0% of all 135 respondents) reported that no guidelines were available at all. County-specific protocols (7.4%) and internally developed guidelines (8.3%) were rare, indicating limited localized adaptation of national guidance to the Tharaka Nithi context (Table 2).

**Table 2**
Types of Cervical Cancer Screening Guidelines Available (n = 121, multiple responses)

| Guideline Type | n | % of Respondents |
|---|---|---|
| Ministry of Health (MOH) guidelines | 86 | 71.1% |
| WHO guidelines | 40 | 33.1% |
| Not available | 27 | 22.3% |
| Internal facility-developed guidelines | 10 | 8.3% |
| County-specific protocols | 9 | 7.4% |

Note: Base n = 121 excludes the 14 respondents who were unsure whether guidelines existed (Section 3.2). "Not available" (n = 27) is 22.3% of these 121 respondents and 20.0% of all 135 respondents.

### *Format of Available Guidelines*

Where guidelines existed, they were most commonly displayed as posters or wall charts (63.6%) rather than provided as detailed printed manuals (19.8%) or digital copies (17.4%) (Table 3). Posters typically summarize screening steps at a glance but cannot substitute for comprehensive manuals needed for in-depth clinical reference, training, or troubleshooting of atypical cases. The low uptake of digital formats also points to limited integration of e-health job aids at the facility level.

**Table 3.**

Format of Available Guidelines (n = 121, multiple responses)

| Format | n | % of Respondents |
|---|---|---|
| Posters/Wall charts | 77 | 63.6% |
| Not available | 27 | 22.3% |
| Printed manuals | 24 | 19.8% |
| Digital (PDF/Softcopy) | 21 | 17.4% |

Note: Base n = 121 excludes the 14 respondents who were unsure whether guidelines existed (Section 3.2). “Not available” (n = 27) is 22.3% of these 121 respondents and 20.0% of all 135 respondents.

### *Guideline Review and Update Status*

Two-thirds of respondents (66.7%, n = 90) reported that guidelines were not regularly reviewed or updated at their facility, and a further 11.1% (n = 15) were unsure, meaning that fewer than one in four respondents (22.2%, n = 30) could confidently confirm an active review process. Because cervical cancer screening protocols evolve periodically at the national and WHO level, guidelines that remain unreviewed risk becoming outdated, which can translate into missed opportunities for early detection and misalignment with current MOH standards. The substantial "don't know" response also suggests low staff awareness of whatever review mechanisms may exist, pointing to a communication and dissemination gap between facility management and frontline screening staff.

### *Training and Orientation on Guideline Use*

More than four in five respondents (80.7%) had never been trained or oriented on using the available screening guidelines. Even where guidelines existed, the near-absence of orientation meant that most healthcare workers may have been using them without structured guidance on correct interpretation and application. Among the small minority (19.3%, n = 26) who had ever received training, only about a quarter (7 of 26) had been trained within the past year, 12 had been trained 1–3 years ago, and 6 had been trained more than three years ago, including one respondent citing training "more than 15 years ago" (Table 4). This pattern suggests the absence of a routine, cyclical retraining or refresher system tied to guideline updates, with training occurring as a one-off event, often at initial deployment, rather than as an ongoing competency-maintenance activity.

**Table 4**
Timeframe of the Last Training on Guideline Use (n = 135)

| Category | Frequency | Percent |
|---|---|---|
| Not applicable / no response (never trained) | 110 | 81.5% |
| Trained within the last 1 year | 7 | 5.2% |
| Trained 1–3 years ago | 12 | 8.9% |
| Trained more than 3 years ago | 6 | 4.4% |
| Total | 135 | 100.0% |

### *Perceived Usefulness of Available Guidelines*

Despite these access, currency, and training gaps, 66.0% of respondents rated the existing guidelines as "Very Useful" (30.4%) or "Somewhat Useful" (35.6%), while only 1.5% actively rated guidelines as not useful; 32.6% rated the item as not applicable, corresponding to facilities without guidelines (Table 5). This finding indicates that where guidelines are accessible, healthcare workers generally consider them functionally useful to their screening work, suggesting that the central preparedness problem lies in access, currency, and training rather than in the content or design of the guidelines themselves.

**Table 5.**
Usefulness of the Available Cervical Cancer Screening Guidelines (n = 135)

| Rating | Frequency | Percent |
|---|---|---|
| Very Useful | 41 | 30.4 |
| Somewhat useful | 48 | 35.6 |
| Not useful | 2 | 1.5 |
| Not applicable | 44 | 32.6 |
| Total | 135 | 100.0 |

### *Guideline Preparedness Across Facility Levels*

A composite guideline-preparedness variable, requiring guidelines to be available, regularly updated, and rated useful, was met by only 22 of 135 facilities (16.3%) overall. This proportion was similarly low across facility levels: 15.0% at Level II, 16.7% at Level III, 18.8% at Level IV, and 33.3% (1 of 3 responding facilities; 3 of the 4 Level V facilities in the county participated) at Level V (Table 6). Comparing preparedness across facility levels using the chi-square test showed no statistically significant difference ($\chi^2(3) = 0.730$, $p = .866$), with a negligible effect size (Cramér's $V = .074$, $p = .866$).

**Table 6.**
Chi-Square Test of Guideline Preparedness by Facility Level

| Facility Level | Not Prepared | Prepared | Total |
|---|---|---|---|
| Level II | 68 | 12 | 80 |
| Level III | 30 | 6 | 36 |
| Level IV | 13 | 3 | 16 |
| Level V | 2 | 1 | 3 |
| Total | 113 | 22 | 135 |

This result indicates that, unlike screening-method availability and treatment capacity, which rise sharply with facility level, guideline preparedness is not concentrated at any single tier: it is a uniformly weak, county-wide condition affecting facilities at every level, including the Level V facilities, where only one of the three responding facilities met the criteria.

## Discussion

This study set out to determine the availability of cervical cancer screening guidelines in Level II–V healthcare facilities in Tharaka Nithi County, Kenya. Just over half (57.8%) of facilities reported having any screening guidelines, and only 16.3% met a composite criterion combining availability, regular review, and perceived usefulness. These findings indicate that, although Kenya has developed comprehensive national cervical cancer screening guidance through the MOH and aligned it with WHO recommendations, this policy architecture is not consistently translating into guideline access at the point of care in a rural county setting.

The dominance of MOH guidelines (71.1%) over WHO guidelines (33.1%), and the near-absence of county-specific or internally developed protocols, suggests that Tharaka Nithi facilities rely primarily on national standard-setting with minimal local adaptation. This is broadly consistent with the international literature: in the United States, multiple bodies including the U.S. Preventive Services Task Force, the American Cancer Society, and the American Society for Colposcopy and Cervical Pathology issue overlapping and sometimes conflicting guidance (Fuzzell et al., 2021), whereas the European Union and countries such as the United Kingdom and Australia operate organized, population-based programmes with centrally coordinated guidelines (von Karsa et al., 2015; NHS, 2015; Cancer Council Australia, 2017). Kenya's reliance on a single national guideline issued centrally by the MOH mirrors the organized-programme model in principle, but the present study shows that guideline dissemination to facility level in a rural county remains incomplete.

The finding that guidelines, where present, were most often displayed as posters or wall charts (63.6%) rather than as comprehensive printed manuals or digital job aids is consistent with observations from other LMIC settings, where fragmented healthcare systems and limited resources constrain standardized guideline implementation (Rakhshanda et al., 2021; Acharya et al., 2024). Posters can support quick point-of-care reference but are unlikely to substitute for the detailed clinical guidance needed to manage atypical presentations, troubleshoot borderline results, or train new staff, suggesting that even facilities counted as having guidelines may not have adequate depth of reference material.

Perhaps the most concerning findings relate to guideline currency and staff training. Two-thirds of respondents reported that guidelines were not regularly reviewed or updated, and over four in five had never received training or orientation on guideline use. This mirrors the broader pattern documented within the county by Kameti (2024), whose study on hypertension management found that 64.5% of facilities reported unsatisfactory utilization of guidelines despite reasonable medicine availability, and by Rufo (2019), who linked persistent staffing and resource gaps in Tharaka Nithi to the effects of devolution on health service delivery. It also aligns with the national baseline assessment by Mwenda et al. (2024), whose 25-county study identified training and commodity gaps as major constraints on Kenya's cervical cancer programme; the present study extends this picture by showing that these training gaps are present even in a county not captured in that national assessment, and that they affect facilities at every level rather than only the lowest tier.

Regionally, the pattern of facility-level variation in guideline adherence documented by Lawson et al. (2023) in Nigeria and by Tapera et al. (2021) in Zimbabwe stands in partial contrast to the

present findings. Both studies found that lower-level facilities exhibited weaker guideline adherence than higher-level ones, whereas in Tharaka Nithi County, guideline preparedness (15.0% at Level II, 16.7% at Level III, 18.8% at Level IV, and 33.3%, 1 of 3 responding facilities at Level V) did not differ significantly by facility level ($\chi^2(3) = 0.730$, $p = .866$, Cramér's $V = .074$). This uniformity is analytically important: it suggests that in this county, the guideline gap is not primarily a lower-tier resourcing problem that can be solved by targeting dispensaries and health centers alone, but a system-wide weakness in guideline distribution, review, and training that also affects the county's most senior referral facility. This interpretation is consistent with the cross-country African evidence from Griesel et al. (2021), who found that facility capacity and guideline adherence, not facility level alone, were the strongest predictors of whether women received timely, appropriate management after a positive screen.

Encouragingly, the low proportion of respondents actively rating guidelines as unhelpful (1.5%), against a substantial 66.0% rating them "Very Useful" or "Somewhat Useful" among those with access, suggests that the content of Kenya's national cervical cancer screening guidelines is not itself the problem. Rather, the preparedness deficit identified in this study is concentrated in the systems that distribute, refresh, and reinforce guideline knowledge among frontline healthcare workers: dissemination channels, review cycles, and training pathways. This distinction has direct implications for intervention design, since improving guideline content would do little to close a gap that is fundamentally about reach and reinforcement rather than substance.

## Conclusion

Cervical cancer screening guidelines are only moderately available across Level II–V healthcare facilities in Tharaka Nithi County (57.8% overall), and where available, are poorly maintained, seldom reviewed, and rarely accompanied by staff training or orientation. Unlike screening capability and treatment capacity, which in this county's broader preparedness assessment were found to rise sharply with facility level, guideline preparedness is a uniformly weak condition affecting facilities at every level, including Level V, where only one of the three responding facilities met the full preparedness criteria despite otherwise stronger screening and treatment infrastructure. The relatively positive perception of guideline usefulness among healthcare workers with access indicates that the deficiency lies in distribution, currency, and training systems rather than in the content or design of the guidelines themselves, and that this is a county-wide systems gap rather than a lower-tier resourcing problem.

## Recommendations

Based on these findings, several recommendations are proposed for policy and practice. First, the County Department of Health should prioritize the county-wide dissemination of both printed and digital cervical cancer screening guidelines, accompanied by practical job aids and wall charts across all levels of health facilities. This recommendation is informed by the finding that guideline preparedness was consistently low across the healthcare system, including at Level V facilities. Second, the county should institutionalize a routine and cyclical system for guideline review and

refresher training rather than relying solely on orientation provided during initial staff deployment. Such an approach would help ensure that healthcare workers remain up to date with evolving recommendations and maintain the competencies required for effective cervical cancer screening services. Third, given that training deficiencies were observed across all facility levels rather than being confined to specific categories of facilities, a standardized and certified cervical cancer screening training curriculum should be implemented uniformly throughout the county. This would replace the current heterogeneous and largely informal training pathways identified in the study and promote consistency in service delivery. In addition, facility managers and county health leadership should strengthen communication mechanisms regarding the existence, location, and implementation of guideline review and update processes. This is particularly important because a considerable proportion of healthcare workers were unable to confirm whether active guideline review procedures were in place. Finally, future research should incorporate on-site observational audits of screening guidelines, equipment, and facility records to complement self-reported information and enhance data validity. Since the present study relied primarily on healthcare worker self-reports collected through Google Forms, direct verification would provide a more robust assessment of facility preparedness and guideline implementation.

## Limitations

This study has several limitations. First, reliance on an electronic questionnaire (Google Forms) may have limited participation from facilities with poor internet connectivity or device access, although follow-up calls and reminders were used to mitigate this. Second, the cross-sectional design provides only a snapshot of guideline availability at a single point in time and does not capture how dissemination or training coverage may have changed subsequently; findings should therefore be interpreted as a baseline that can inform future longitudinal monitoring. Third, the study was confined to Tharaka Nithi County and may have limited generalizability to counties with different health system characteristics, although the county's semi-rural profile and mixed facility levels may make it a useful case reference for similar settings. Fourth, data on guideline availability, review status, and training were self-reported by the healthcare worker in charge of screening at each facility, without independent on-site verification; this may be subject to social desirability bias, a recognized limitation in provider-reported facility-readiness assessments (Dhillon et al., 2020; Mwenda et al., 2024). Findings should be interpreted with this in mind. Fifth, response rates differed by facility level (Level II 70.2%, Level III 67.9%, Level IV 80.0%, Level V 75.0%), so differential non-response may have affected the level-stratified comparisons, and only three of the four Level V facilities responded, which limits the precision of Level V estimates. Future studies should include on-site observational audits to verify self-reported data.

## Declarations

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## Ethics Approval and Consent to Participate

Ethical clearance was obtained from the Institutional Review and Ethics Committees (IREC) of Kabarak University and Tharaka Nithi County, with a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) and authorization from the County Department of Health. All participants provided informed consent electronically before completing the questionnaire.

### Consent for Publication

Not applicable. No individual or facility-identifiable data are reported in this manuscript.

### Availability of Data and Materials

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

### Competing Interests

The authors declare that they have no competing interests.

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This research was conducted as part of a Master of Medicine in Family Medicine thesis at Kabarak University.

### Authors' Contributions

KDD conceptualized and designed the study, collected and analyzed the data, and drafted the manuscript. JN and BA supervised the study design and data analysis and critically revised the manuscript. All authors read and approved the final manuscript.

### Licensing Statement

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