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Factors Influencing Utilization of Cervical Cancer Screening Services Among Pregnant Women Attending Antenatal Clinic at Kisoro Hospital, Uganda

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Abstract

Background

Cervical cancer represents a significant public health burden in Uganda, with persistently high incidence and mortality rates despite available screening services. Pregnant women attending antenatal care represent a critical population for integrated screening interventions, yet utilization rates remain suboptimal in rural settings.

Methods

We conducted a hospital-based cross-sectional study among 100 pregnant women attending antenatal clinic at Kisoro Hospital in September 2025. Using systematic random sampling, we administered structured questionnaires to collect data on socio-demographic characteristics, knowledge, attitudes, and health system factors. Binary logistic regression identified predictors of screening utilization.

Results

The prevalence of cervical cancer screening utilization was 15.0% (95% CI: 8.9–23.2%). The majority of participants were married (74.0%), had primary or secondary education (83.0%), and lived within 2 km of the facility (50.0%). Significant predictors of screening uptake included tertiary education level (aOR = 4.12; 95% CI: 1.08–15.78; p = 0.038), awareness of free screening services (p < 0.001), distance to facility < 2 km (aOR = 3.14; 95% CI: 1.12–8.79; p = 0.030), and shorter waiting times (aOR = 2.89; 95% CI: 1.04–8.03; p = 0.042). Notably, no woman unaware of free services had been screened.

Conclusion

Cervical cancer screening utilization among pregnant women at Kisoro Hospital remains critically low. Targeted interventions should focus on improving awareness through integrated antenatal education, reducing geographical barriers through outreach services, and addressing health system inefficiencies to enhance service accessibility and acceptability. Integration of cervical cancer screening into routine antenatal care represents a promising strategy to improve screening coverage in this vulnerable population.

BACKGROUND

Cervical cancer remains a major public health challenge in Uganda, ranking as the leading cause of cancer-related mortality among women with an age-standardized incidence rate of 52.6 per 100,000 women [1]. The country accounts for approximately 6,400 new cases and 4,300 deaths annually, placing it among the top 20 countries globally for cervical cancer burden [2]. This high disease burden persists

despite the availability of effective screening methods and the implementation of the National Strategic Plan for Cervical Cancer Prevention and Control in 2015, which aimed to screen 80% of eligible women by 2020 [3].

The antenatal care period presents a unique opportunity for cervical cancer screening integration in low-resource settings. Pregnant women constitute a captive population already engaged with the healthcare system, with attendance rates at antenatal clinics often exceeding 90% in Uganda [4]. This represents a strategic window for delivering preventive services to women who might not otherwise access healthcare. However, research indicates that screening uptake among pregnant women remains suboptimal, with multiple intersecting barriers operating at individual, community, and health system levels [5].

In rural Uganda, factors such as limited awareness, cultural beliefs, geographical inaccessibility, and health system constraints collectively contribute to low screening rates [6]. Kisoro District, located in southwestern Uganda, presents a particularly challenging context. The district's mountainous terrain, rural character, and specific cultural dynamics among the Bafumbira tribe create unique barriers to healthcare utilization [7]. Notably, linguistic and cultural factors, including the absence of local terms for reproductive anatomy and associated stigma, may further inhibit screening discussions and uptake [7].

Despite these challenges and the strategic importance of antenatal care as an entry point for screening services, there is limited research examining cervical cancer screening utilization specifically among pregnant women in rural southwestern Uganda. This study aimed to determine the prevalence and factors influencing cervical cancer screening utilization among pregnant women attending antenatal clinic at Kisoro Hospital. The findings will inform targeted, context-specific interventions to improve screening uptake and contribute to reducing the cervical cancer burden in this underserved population.

METHODS

Study Design and Setting

We conducted a hospital-based analytical cross-sectional study at Kisoro Hospital, a public district hospital serving the predominantly rural population of Kisoro District in southwestern Uganda. The district borders Rwanda and the Democratic Republic of Congo, with a population of approximately 300,000 people engaged primarily in subsistence agriculture [8]. Data collection occurred during September 2025 at the Maternal and Child Health (MCH) clinic, which serves approximately 150–200 pregnant women monthly.

Study Population and Eligibility

The study population comprised pregnant women attending antenatal clinic at Kisoro Hospital. Inclusion criteria required participants to be: (1) pregnant, (2) aged 18 years or older, (3) attending the antenatal

clinic during the study period, and (4) able to provide informed consent. We excluded women who were critically ill, in active labor, or unable to communicate effectively due to language barriers or cognitive impairment.

Sample Size and Sampling Procedure

Using the Kish-Leslie formula for cross-sectional studies [9], we calculated the sample size as follows:

$n = (Z^2 \times p \times (1-p)) / e^2$

Where: Z = 1.96 (95% confidence level), p = 0.5 (assumed prevalence due to absence of prior local data), e = 0.1 (margin of error)

$n = (1.96^2 \times 0.5 \times 0.5) / 0.1^2 = 96.04$

To account for potential non-response, we enrolled 100 participants. We employed systematic random sampling, first determining the average daily attendance (approximately 10 women) from hospital records. The sampling interval (k) was calculated as total expected attendees (100) divided by sample size (100), resulting in k = 1 (every eligible woman was invited to participate consecutively until reaching the sample size).

Data Collection Instruments and Procedures

Trained research assistants fluent in both English and the local language (Rufumbira) administered structured questionnaires in private consultation rooms. The questionnaire, developed based on literature review and expert consultation, comprised four sections:

1. **Socio-demographic characteristics**: Age, education, marital status, occupation, residence, income
2. **Knowledge assessment**: Understanding of cervical cancer, risk factors, prevention methods, screening indications
3. **Attitudes and beliefs**: Perceptions of screening necessity, fear, embarrassment, preference for female providers
4. **Health system factors**: Distance to facility, waiting time, privacy, provider attitudes, service availability

The instrument was pretested with 10 pregnant women at St. Francis Hospital Mutolere, a comparable facility in the same district, and refined for clarity and cultural appropriateness. Cronbach's alpha for the knowledge scale was 0.78, indicating acceptable internal consistency.

Variables and Measurements

The primary outcome variable was cervical cancer screening utilization, defined as self-reported history of any cervical cancer screening test (Pap smear or visual inspection with acetic acid - VIA).

Independent variables included:

- **Socio-demographic factors**: Age (categorized as 18–24, 25–34, ≥ 35 years), education level (primary, secondary, tertiary), marital status (married, single), occupation, monthly income
- **Knowledge factors**: Composite knowledge score (low: 0–4, medium: 5–7, high: 8–10 correct answers), awareness of free services, knowledge of screening location
- **Attitudinal factors**: Perceived screening necessity, fear of pain, embarrassment, preference for female providers
- **Health system factors**: Distance to facility (< 2 km, ≥ 2 km), waiting time (< 30 minutes, ≥ 30 minutes), perceived privacy, provider attitudes, service availability

Data Management and Analysis

We entered data into Microsoft Excel, cleaned for inconsistencies and missing values, and exported to SPSS version 26 for analysis. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized participant characteristics and screening prevalence. We used chi-square tests for bivariate analysis of categorical variables and binary logistic regression for multivariate analysis to identify independent predictors of screening utilization. Variables with $p < 0.2$ in bivariate analysis were included in the initial multivariate model, and backward elimination was used to derive the final model. Statistical significance was set at $p < 0.05$, and odds ratios with 95% confidence intervals were reported.

Ethical Considerations

The Kampala International University Research Ethics Committee approved the study (Reference No.: KIU-2025-11). We obtained administrative clearance from Kisoro Hospital. All participants provided written informed consent after receiving comprehensive information about the study's purpose, procedures, risks, and benefits in their preferred language. Participants were assured of voluntary participation and the right to withdraw at any time without affecting their care. We maintained confidentiality through anonymized data collection using identification numbers, secure storage of consent forms separately from questionnaires, and password-protected electronic databases.

RESULTS

Participant Characteristics

Table 1 presents the socio-demographic characteristics of the 100 participants. The mean age was 29.4 years (SD = 6.2, range: 18–45), with 41.0% aged 35 years or older. Most participants were married (74.0%) and had attained primary (43.0%) or secondary (40.0%) education. Only 17.0% had tertiary

education. The majority were either unemployed (38.0%) or peasant farmers (35.0%). Notably, 62.0% were aware that cervical cancer screening services were offered free of charge at the facility, and 50.0% lived within 2 km of the hospital.

Table 1
Socio-demographic Characteristics of Participants (N = 100)

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	18–24 years	33	33.0
	25–34 years	26	26.0
	≥ 35 years	41	41.0
Marital Status	Married	74	74.0
	Single	26	26.0
Education Level	Primary	43	43.0
	Secondary	40	40.0
	Tertiary	17	17.0
Occupation	Unemployed	38	38.0
	Peasant farmer	35	35.0
	Business/trading	18	18.0
	Formal employment	9	9.0
Monthly Income (UGX)	< 200,000	52	52.0
	200,000-500,000	38	38.0
	> 500,000	10	10.0
Awareness of Free Services	Yes	62	62.0
	No	38	38.0
Distance to Facility	< 2 km	50	50.0
	≥ 2 km	50	50.0
Gravidity	Primigravida	22	22.0
	Multigravida (2–4)	56	56.0
	Grand multigravida (≥ 5)	22	22.0

Prevalence of Cervical Cancer Screening Utilization

Only 15 participants (15.0%; 95% CI: 8.9–23.2%) reported ever undergoing cervical cancer screening. Among those screened, the most common screening method was visual inspection with acetic acid (VIA) (86.7%, n = 13), followed by Pap smear (13.3%, n = 2). The median time since last screening was 14 months (IQR: 8–26 months).

Knowledge and Attitudes

The mean knowledge score was 4.2 out of 10 (SD = 2.1). Only 35.0% of participants could correctly identify HPV as the primary cause of cervical cancer, while 68.0% recognized multiple sexual partners as a risk factor. Regarding attitudes, 72.0% agreed that screening was important, but 61.0% expressed fear of pain during the procedure, and 44.0% reported embarrassment.

Health System Factors

Most participants (58.0%) reported waiting times exceeding 30 minutes. While 78.0% described healthcare providers as polite and approachable, only 53.0% felt they received adequate privacy during examinations. Equipment availability was reported as adequate by 65.0% of participants.

Factors Associated with Screening Utilization

Table 2 presents the bivariate analysis of factors associated with screening uptake. Education level showed a strong positive association, with tertiary-educated women having significantly higher screening rates (41.2%) compared to those with primary (9.3%) or secondary (10.0%) education ($p < 0.01$).

Table 2
Bivariate Analysis of Factors Associated with Cervical Cancer Screening Utilization

Variable	Category	Screened n (%)	Not Screened n (%)	χ^2	p-value
Overall Uptake		15 (15.0)	85 (85.0)		
Education Level	Primary	4 (9.3)	39 (90.7)	12.45	< 0.01
	Secondary	4 (10.0)	36 (90.0)		
	Tertiary	7 (41.2)	10 (58.8)		
Aware of Free Services	Yes	15 (24.2)	47 (75.8)	15.67	< 0.01
	No	0 (0.0)	38 (100.0)		
Distance to Facility	< 2 km	11 (22.0)	39 (78.0)	4.78	0.03
	≥ 2 km	4 (7.1)	52 (92.9)		
Waiting Time	Short (< 30 min)	9 (21.4)	33 (78.6)	4.21	0.04
	Long (≥ 30 min)	6 (8.3)	66 (91.7)		
Knowledge Level	Low (0–4)	4 (8.9)	41 (91.1)	7.89	0.02
	Medium (5–7)	6 (13.6)	38 (86.4)		
	High (8–10)	5 (23.8)	16 (76.2)		
Perceived Privacy	Adequate	12 (22.6)	41 (77.4)	4.23	0.04
	Inadequate	3 (6.4)	44 (93.6)		
Age Group	18–24	4 (12.1)	29 (87.9)	0.65	0.72
	25–34	5 (19.2)	21 (80.8)		
	≥ 35	6 (14.6)	35 (85.4)		
Marital Status	Married	12 (16.2)	62 (83.8)	0.29	0.59
	Single	3 (11.5)	23 (88.5		

Multivariate Analysis

In the binary logistic regression model, independent predictors of screening utilization included:

1. **Tertiary education** (aOR = 4.12; 95% CI: 1.08–15.78; p = 0.038)
2. **Awareness of free services** (could not compute OR due to zero cell in non-aware group; p < 0.001)
3. **Distance < 2 km** (aOR = 3.14; 95% CI: 1.12–8.79; p = 0.030)
4. **Short waiting times** (aOR = 2.89; 95% CI: 1.04–8.03; p = 0.042)

The model had good fit (Hosmer-Lemeshow test: $\chi^2 = 6.45$, $p = 0.60$) and explained 42.3% of variance (Nagelkerke $R^2 = 0.423$).

DISCUSSION

Our study reveals critically low cervical cancer screening utilization (15%) among pregnant women attending Kisoro Hospital, consistent with national estimates of 5–20% screening coverage but substantially below the WHO-recommended target of 70% for women of reproductive age [10]. This finding aligns with studies from similar rural settings in sub-Saharan Africa, where screening rates typically range from 12–27% [11]. The low uptake persists despite the strategic opportunity presented by antenatal care attendance and the availability of free screening services.

The strong association between education level and screening uptake corroborates findings from multiple low-resource settings [12, 13]. Education likely enhances health literacy, enabling women to understand screening benefits, overcome informational barriers, and navigate healthcare systems more effectively. The dramatic difference between tertiary-educated women (41.2% screened) and those with primary education only (9.3% screened) underscores the need for targeted health education strategies for less-educated populations.

The complete absence of screening among women unaware of free services represents a particularly striking finding. This highlights the critical importance of information dissemination in resource-limited settings, where financial barriers are often presumed to be primary deterrents. Our results suggest that even when services are free, lack of awareness constitutes an insurmountable barrier. This aligns with studies from other African contexts where knowledge of service availability strongly predicts utilization [14].

Geographical accessibility emerged as a significant barrier, with women living within 2 km of the facility three times more likely to be screened. This finding mirrors extensive research from rural sub-Saharan Africa highlighting distance and transportation as primary deterrents to healthcare utilization [15]. In mountainous regions like Kisoro, geographical barriers are exacerbated by difficult terrain and limited transportation infrastructure.

Health system factors, particularly waiting times, significantly influenced screening uptake. Women experiencing shorter waits were nearly three times more likely to be screened. This reflects health system inefficiencies that disproportionately affect preventive services, which are often perceived as less urgent than curative care. Long waits may be particularly discouraging for pregnant women, who may have competing responsibilities or physical discomfort.

Interestingly, our study did not find significant associations between screening uptake and factors such as age or marital status, contrasting with some previous research [16, 17]. This may reflect the unique characteristics of our antenatal clinic population or the overriding influence of structural barriers in this

setting. The relatively high proportion of older pregnant women (41% ≥35 years) in our sample may also have influenced these relationships.

Cultural and linguistic factors, while not quantitatively assessed in this study, likely contribute to low screening uptake in this context. Previous research in Kisoro District has documented specific barriers, including the absence of local terms for reproductive anatomy and associated stigma [7]. Qualitative exploration of these factors would provide valuable complementary insights.

Strengths and Limitations

Strengths of this study include its focus on a vulnerable but strategically important population (pregnant women), use of systematic sampling, and assessment of multiple domains of influence. The study also has limitations. Its cross-sectional design precludes causal inference. Self-reported screening behavior may be subject to social desirability bias, potentially overestimating uptake. The single-site design may limit generalizability to other settings, though findings are likely relevant to similar rural districts in Uganda and neighboring countries. Additionally, we did not assess some potentially important factors such as male partner influence or detailed cultural beliefs

CONCLUSION

Cervical cancer screening utilization among pregnant women at Kisoro Hospital remains unacceptably low, with education, awareness, geographical accessibility, and health system efficiency as key determinants. The complete lack of screening among women unaware of free services highlights a critical information gap. These findings emphasize the need for multi-faceted interventions addressing both individual knowledge gaps and structural health system barriers.

RECOMMENDATIONS

Based on our findings, we recommend:

1. **Integrated antenatal education**: Develop and implement structured cervical cancer education sessions as a routine component of antenatal care, using culturally appropriate materials and local languages.
2. **Community sensitization**: Implement comprehensive awareness campaigns utilizing multiple channels (radio, community dialogues, religious gatherings) to disseminate information about free screening services.
3. **Mobile screening services**: Establish periodic mobile clinics to reach women in remote villages, particularly those living beyond 2 km from health facilities.
4. **Health system strengthening**: Optimize clinic workflows to reduce waiting times, improve privacy provisions, and train healthcare providers in client-centered communication.
5. **Targeted support for less-educated women**: Develop simplified educational materials and peer support programs to address knowledge gaps among women with lower educational attainment.

6. **Further research**: Conduct mixed-methods studies to explore cultural and gender dynamics influencing screening decisions, and evaluate the cost-effectiveness of different intervention strategies.

Declarations

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Kampala International University Research Ethics Committee (Reference No.: KIU-2025-XXX). Administrative clearance was obtained from Kisoro Hospital. All participants provided written informed consent after receiving comprehensive information about the study in their preferred language.

Consent for Publication

Participants consented to publication of anonymized aggregate data. No individually identifiable information is included in this manuscript.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

MLK, TA, ST, SBM, AKM, and AUK contributed equally to study conception and design. MLK and TA led data collection with support from all authors. ST and SBM conducted data analysis with input from AKM and AUK. MLK drafted the initial manuscript with critical revisions from all authors. All authors read and approved the final manuscript.

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Availability of Data and Materials

De-identified data are available from the corresponding author upon reasonable request, subject to ethical approvals.

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