



Knowledge and Uptake of Cervical Cancer Screening among Women aged 15-50 attending a District Hospital in Rwanda

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ABSTRACT

Background

Cervical cancer ranks as the second leading cause of death among women globally, with alarming figures of new cases and fatalities recorded annually. In Rwanda, it stands as the primary cause of death in women aged 15 to 44, with a substantial incidence of new cases diagnosed yearly. Despite the proven benefits of early detection, many Rwandan women present with advanced stages of the disease, reflecting low attendance for screening despite available programs.

Materials and Methods

A quantitative cross-sectional approach was utilized in this study, with a sample of 424 women aged 15 to 50 selected using systematic sampling with a random start. Descriptive, bivariate, and multivariate logistic regression analyses were conducted to explore the relationships between demographic variables, knowledge levels, and cervical cancer screening uptake. Data were collected using a structured questionnaire, and ethical clearance was obtained from relevant authorities. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) Version 20.0.

Results

The study included 424 women aged 15 to 50, with 79.2% from Gasabo District and 49.3% from Kigali. Age distribution was 35.4% aged 15-24, 38.7% aged 25-34, and 25.9% aged 35 and above. Educationally, 40.6% had a secondary level of education. Most participants (56.6%) were single/divorced/widowed, and 41% were unemployed. The majority (88.9%) were Christians, and 9.4% were Muslim. The prevalence of cervical cancer screening uptake was 38.2%, and 48.1% had a high level of knowledge about cervical cancer.

Conclusion:

The findings underscore a low uptake of cervical cancer screening and knowledge levels among the study population. Notably, high knowledge levels emerged as the primary predictor of screening behavior. Consequently, there is a pressing need for the Ministry of Health to implement targeted health promotion campaigns aimed at enhancing knowledge and increasing uptake of cervical cancer screening among women nationwide, thus mitigating the burden of cervical cancer and improving public health outcomes.

Keywords: Knowledge, Uptake, Cervical Cancer, Screening, Rwanda

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INTRODUCTION

Cervical cancer is the second leading cause of death in women worldwide, with an estimated 604,127 new cases and 341,831 deaths by 2020 (1). In the Rwandan ministry, 2.72 million women are at risk of contracting the disease resulting from genital infection caused by the papillomavirus (HPV) (2). Rwanda is among the countries with high cervical cancer burden, where cervical cancer is the most common cancer in adults with an incidence rate of 28.2/100,000 women (1229 new cases) and a mortality rate of 20.1/100,000 (829 deaths) in 2020 (WHO estimates). The high global mortality rate from cervical cancer (age standardized rate in females: 13.3/100 000 in 2020) compared to the global rate, Rwanda doubles the rate. With 32% of all cancer diagnoses among Rwandan women, cervical cancer is one of the most chronic diseases (3).

Studies have reported that knowledge is an important predictor of individual behavioral changes to reduce cancer risk (4). By immunizing girls against HPV and by screening and treating women for precancerous lesions, cervical cancer can be avoided. In Rwanda, all girls between the ages of 11 and 15 are already eligible for the HPV vaccine. However, many women who were born before the program's start date are not protected, and screening rates in this population continue to be low. The government is currently carrying out a pilot initiative to become one of the first nations to eradicate cervical cancer. By immunizing girls against HPV and by screening and treating women for precancerous lesions, cervical cancer can be avoided (4).

In Rwanda, HPV vaccination is already available to all females as young as 12 years old. In order to identify lesions before they develop into cancer, the government is currently evaluating a screen-and-treat program in medical facilities (3). There is a group of women born before the vaccination program who are not now immunized against HPV and are at risk of developing cervical cancer. Rwanda has also launched low-cost opportunistic cervical cancer screening utilizing visual cervix examination with acetic acid (VIA) and an HPV DNA test for women starting at the age of 35, with a follow-up screening after seven years for negative results. National initiatives based on cytology testing have led to a >80% decrease in the prevalence of cervical cancer in high-income nations). In Rwanda, public district hospitals and a few pilot-selected health institutions perform cervical cancer screening exams (Ministry of Health). However,

acceptance of Pap smear screening is still low. At the Rwanda Military Hospital, for example, out of an average of 4 women who seek a Pap smear screening test consultation, only 25% eventually complete cervical cancer screening (5).

The introduction of cervical cancer screening is critical to the prevention and control of cervical cancer. Studies have linked lower screening utilization to limited knowledge about cervical cancer and its risk factors (6). In Rwanda, the government has encouraged women aged 30 to 49 to have Pap smear screening (7). Women can now undergo inexpensive opportunistic screening for cervical cancer utilizing visual examination of the cervix with acetic acid (VIA) and HPV DNA testing, with a follow-up test after seven years for negative results (3). The Ministry of Health has also set up screening facilities in the district hospitals and some pilot health centers, but screening uptake is reportedly still low (Alphonse Butoyi, Consultant Gynecologist, Rwanda Military Hospital, Personal Communication). In the proposed study, older women visiting a district hospital in Rwanda will have their knowledge and acceptance of cervical cancer screening evaluated.

2. Research purpose

The study assessed the knowledge and uptake of cervical cancer screening among women attending a District Hospital in Rwanda.

3. Materials and Methods

3.1 Study design

This study employed a cross-sectional design to gather data on cervical cancer screening uptake and knowledge among women aged 15 to 50 seeking medical care at Kibagabaga Hospital in Kigali City. A descriptive quantitative research approach was used to collect and analyze the data, which were then subjected to statistical analysis to ensure the accuracy and reliability of the findings. This methodology enabled the researcher to simultaneously compare various variables, providing a comprehensive understanding of the factors influencing cervical cancer screening uptake and knowledge among the participants.

3.2 Study Population

The study population comprised women aged 15 to 50 who sought and received antenatal care services at Kibagabaga District Hospital between January and March 2023. Kibagabaga Hospital, located in Rwanda's capital city of

Kigali City, Gasabo District, serves an overall population of 894,055 and has a bed capacity of 225. The hospital's staffing includes 1 chief consultant specialist, 4 consultant specialists, 8 junior consultant specialists, 24 general medical practitioners, 92 nurses, 42 midwives, and 40 paramedical staff, offering 14 services including OPD Gyneco, maternity, and postnatal care, as outlined in the Kibagabaga Strategic Plan. With an average of 298,152 women at risk of cervical cancer, the hospital attends to approximately 200 such cases daily. Moreover, its active Obstetrics and Gynecological Department handles an average of 630 cases per month, as calculated between May (651), June (567), and July (672), all falling within the age range of 15 to 50. Consequently, this hospital was selected as the focal point for this study.

3.3 Sample Size

The sample size calculation followed the single proportion formula as recommended by Fisher et al. (1998). Due to the lack of available data on cervical cancer screening prevalence among women in the Kibagabaga area, a conservative estimate of 50% (0.5) was utilized, drawing on analogous contexts or assumptions (Makuza et al., 2015). To achieve a 95% confidence level, the Standard Normal Deviate (Z) was set at 1.96, representing the standard deviations from the mean in a two-tailed test. Additionally, a non-response rate of 10% was factored in, accounting for the possibility that 10% of the selected individuals might not participate in the survey or study.

The sample size calculation followed the formula:

$$n = \frac{(Z)^2 \cdot p \cdot (1-p)}{d^2}$$

Where:

- n = desired sample size
- p = prevalence of cervical cancer screening among women (assumed to be 0.5 or 50%)
- Z = standard normal deviate corresponding to the desired confidence level (1.96 for a 95% confidence level)
- d = margin of error (assumed to be 0.05 or 5%)

Plugging in the values, we obtained:

$$n = \frac{(1.96)^2 \cdot 0.5 \cdot (1-0.5)}{(0.05)^2} = 385$$

To account for the anticipated 10% non-response rate, 10% of the calculated sample size (385) is added to the initial sample size:

$$385 + (0.10 \cdot 385) = 424$$

Thus, the final sample size required for the study was 424 women.

3.4 Sampling technique

The respondents were systematically selected from a pool of 800 women over a three-month period, employing a random start. With a target sample size of 424, this method entailed selecting every second woman. To uphold fairness in participant selection, the initial participant was chosen through a randomized lottery process.

3.5 Data Analysis

The study aimed to evaluate cervical cancer screening knowledge and uptake among women at Kibagabaga District Hospital in Rwanda. Employing a cross-sectional quantitative approach, 424 women aged 15 to 50 were systematically chosen. Analysis encompassed descriptive, bivariate, and multivariate logistic regression methods, employing data from structured questionnaires. Findings unveiled a low screening uptake prevalence (38.2%) alongside moderate knowledge levels (48.1%). Bivariate analysis underscored significant associations between screening uptake and variables such as age group, education level, and overall knowledge ($p < 0.05$). However, multivariable regression revealed only knowledge level as a predictor, with respondents exhibiting high knowledge being 2.57 times more likely to screen ($p < 0.001$). In conclusion, both screening uptake and knowledge levels were low, stressing the necessity for nationwide health promotion initiatives to bolster both aspects. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) Version 20.0.

4. Findings

In this section, the study comprehensively evaluated the understanding and utilization of cervical cancer screening among women receiving care at a District Hospital in Rwanda. The assessment focused on multiple dimensions, including the uptake of screening services, awareness

levels regarding cervical cancer, and the key factors influencing screening participation among female attendees at Kibagabaga Hospital in Gasabo District, Rwanda.

4.1 Uptake of Cervical Cancer Screening among Women Attending Kibagabaga Hospital

Table 1 Uptake of cervical cancer screening of study participants

Variables	Frequency	Percent
Ever screened in a lifetime		
Yes	162	38.2
No	262	61.8
Screened in past 2 years		
Yes	50	30.86
No	112	69.14

Source: Primary Data, (2023)

The table 4.2 presents the prevalence of ever screened for cervical cancer in lifetime. The results showed that 38.2% of participants agreed that they were ever screened in a lifetime and 61.8% not ever screened. On the question if participants screened in the past 2 years, only 30.86% screened in the past 2 years and 69.14% were not screened in the past 2 years. The results showed that cervical cancer screening is low, the campaign should be organized to mobilize women to be

The first objective was the uptake of cervical cancer screening, the recording is scored by describing the proportion among 424 selected women from Kibagabaga Hospital who responded yes to the inquiry on (i) whether they have ever or never had a pap smear test in a lifetime, and (ii) if they had a pap smear in two years (Table 1).

screened.

4.2 Knowledge of cervical cancer of the study participants

Cervical cancer knowledge was assessed based on participants' responses to 21 questions that assess knowledge of at-risk groups, risk factors, signs and symptoms, and prevention methods of cervical cancer. The results are presented in table 2.

Table 2 Knowledge of Cervical Cancer among Women Attending Kibagabaga Hospital in Gasabo District in Rwanda

Statements	Yes, n(%)	No, n(%)
Knowledge on risk factors of Cervical cancer		
Unprotected sex	257 (60.6)	167 (39.4)
HPV	266 (62.7)	158 (37.3)
Sex with someone who has multiple partners	255 (60.1)	169 (39.9)
Having multiple partner	260 (61.3)	164 (38.7)
STIs	247 (58.3)	177 (41.7)
Smoking	273 (64.4)	151 (35.6)
Using oral pills	245 (57.8)	179 (42.2)
Family history of cervical cancer	228 (53.8)	196 (46.2)
Weak immune system	209 (49.3)	215 (50.7)

Sex before 18yrs	211 (49.8)	213 (50.2)
Pregnancy before 17yrs	164 (38.7)	260 (61.3)
Mean score	6.2	
Knowledge on signs and symptoms of cervical cancer		
There is no symptoms at early stage	403 (95.0)	21 (5.0)
Abnormal vaginal bleeding	158 (37.3)	266 (62.7)
Pain during sex	147 (34.7)	277 (65.3)
Abnormal vaginal discharge	278 (65.6)	146 (34.4)
Persistence pelvic pain	195 (46.0)	229 (54.0)
Mean score	2.8	
Knowledge on cervical cancer treatment and prevention		
Helpful early detection	180 (42.5)	244 (57.5)
Cervical cancer is curable at early stage	367 (86.6)	57 (13.4)
Cervical cancer is preventable	173 (40.8)	251 (59.2)
Mean score	1.7	

Source: Primary Data, (2023)

The table 2 presents the results on the Knowledge of cervical cancer among women attending Kibagabaga Hospital. Out of 424 participants, most knew that unprotected sex (60.6%), human papillomavirus (HPV) (62.7%), having sex with someone who has multiple partners (60.1%), multiple partners (61.3%), STIs (58.3%), smoking (64.4%) and using oral pills (57.8%) were the risk of cervical cancer. However, only 38.7% indicated that being pregnant before the age of 17 years was the risk of cervical cancer.

Regarding the signs and symptoms, a large percentage (95.0%) reported that cervical cancer doesn't have any symptoms at an early stage. However, only 37.3%, 34.7% and 46.0% indicated abnormal vaginal bleeding, pain during sex and consistent pelvic pain respectively were signs of cervical cancer while most (65.6%) indicated abnormal vaginal bleeding was the common sign of cervical cancer. In terms of treatment and prevention, the majority (86.6%) pointed out that CC can be treated if detected at an early stage. However, only 42.5%

indicated that early detection is important and 40.8% said that cervical cancer is preventable

4.3 Level of knowledge on cervical cancer

A score assessment was used to determine the level of knowledge. The correct response was given a score of 1 and the incorrect response was allocated 0. The scores were aggregated and mean was calculated. The level of knowledge was categorized based on the mean. Those who scored above the mean were grouped as having high knowledge while below mean were grouped as having low level of knowledge. The mean for knowledge on risk factors was 6.2 out of 11 parameters, knowledge on signs/symptoms was 2.8 out of 5 parameters and knowledge on treatment/prevention was 1.7 out of 3 parameters. The mean score for the overall was 10.6 out of 19 parameters. Figure 4.1. shows the overall knowledge. And Figure 4.1.1 shows the level of knowledge on risk factors, signs/symptoms and treatment/prevention.

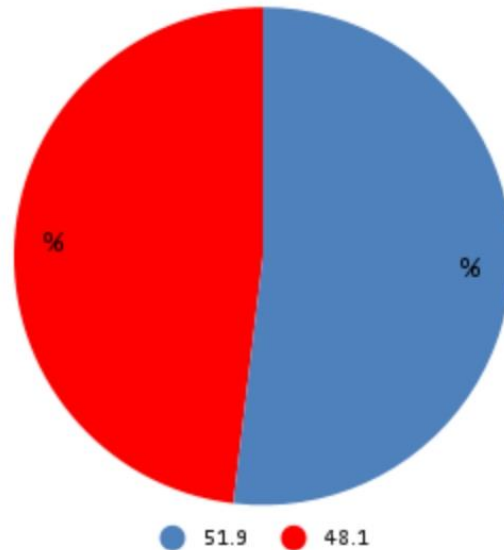


Figure 1 Overall Level of knowledge on cervical cancer

Source: Primary data, (2023)

On the overall level of knowledge, 51.9% of 242 participants had a high knowledge level on cervical cancer.

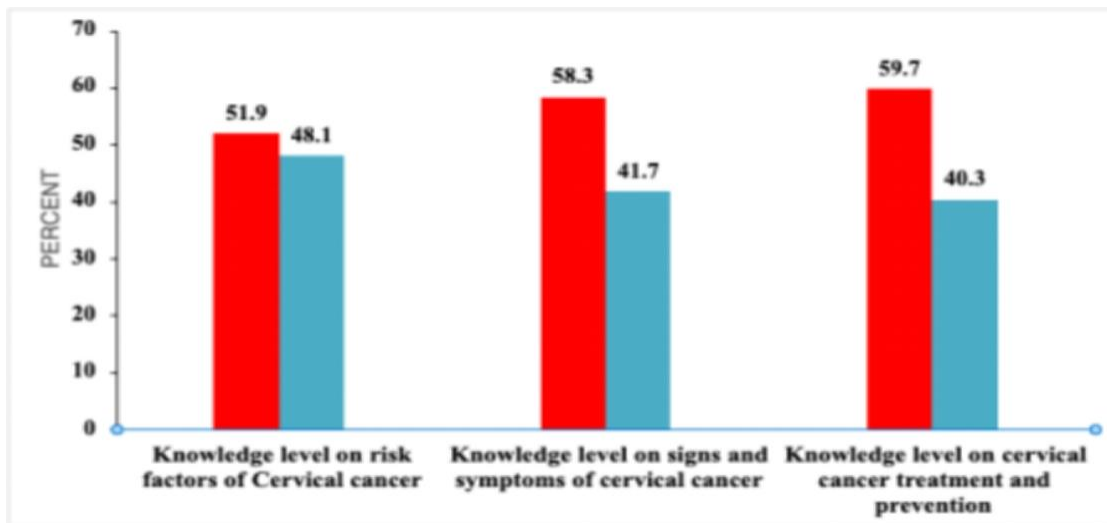


Figure 2 Level of knowledge on risk factors, signs/symptoms, and treatment/prevention of cervical cancer

Source: Primary data, (2023)

Figure 2 indicates the level of knowledge on risk factors, signs/symptoms, and treatment/prevention. Out of 424 participants, 48.1% of the respondents had a high level of knowledge on risk factors of cervical cancer, 58.3% had a high knowledge level on signs and symptoms of cervical cancer, and 59.7% had a high knowledge level on cervical cancer treatment and prevention. Researcher presented the overall knowledge of women on cervical cancer,

according to the results, the overall percentage of women with low knowledge was 56.63% while the overall percentage of women with high knowledge was 43.37% of participants.

4.4 Factors associated with uptake of cervical cancer screening among women attending Kibagabaga Hospital in Gasabo District

Table 3, presents bi-variate analysis for factors associated with uptake of cervical cancer. while Table 4 shows multi-variable logistic regression analysis for the

independent factors associated with uptake of cervical cancer screening.

Table 4. Relationship between socio-demographic factors and uptake of cervical cancer screening

Variables	Uptake of cervical cancer screening				Chi-square value	P value
	Yes		No			
	n	%	n	%		
Address District						
Gasabo	126	37.5	210	62.5	3.56	0.169
Kicukiro	23	35.4	42	64.6		
Others	13	56.5	10	43.5		
Address sector						
Remera	23	40.4	34	59.6	4.96	0.291
Kimironko	73	34.9	136	65.1		
Kinyinya	30	42.3	41	57.7		
Bumbogo	23	35.9	41	64.1		
Others	13	56.5	10	43.5		
Age group in years						
15 to 24	48	32.0	102	68.0	6.73	0.034
25 to 34	75	45.7	89	54.3		
35 and above	39	35.5	71	64.5		
Level of education						
None	22	26.5	61	73.5	12.60	0.006
Primary	34	31.2	75	68.8		
Secondary	79	45.9	93	54.1		
Tertiary	27	45.0	33	55.0		
Marital status						
Married/Cohabiting	65	35.3	119	64.7	1.14	0.285
Single/divorced/widowed	97	40.4	143	59.6		
Occupation						
Unemployed	77	44.3	97	55.7	7.76	0.170
Self employed	27	35.5	49	64.5		
Government employee	22	31.9	47	68.1		
Private employed	17	37.0	29	63.0		
Student	14	41.2	20	58.8		
Others	5	20.0	20	80.0		
Religion						
Christian	151	40.1	226	59.9	5.20	0.074
Muslim	10	25.0	30	75.0		
Others	1	14.3	6	85.7		
Level of Knowledge						
High	107	48.6	113	51.4	21.06	0.001
Low	55	27.0	149	73.0		

Source: Primary Data, (2023)

Table 3 indicates that there was a significant association between the Age group in years and uptake of cervical cancer screening (P-value = 0.034). There was a strong association between level of education and uptake of cervical cancer screening (P-value = 0.006) as well as between overall level of knowledge and uptake of cervical cancer screening (P-value = 0.001) that indicated that there was significant knowledge of cervical cancer screening in Gababo District Hospital, Rwanda. And relationship between other bio-demographic factors (address, religion, occupation, and marital status) and uptake of cervical cancer screening among women

attending Kibagabaga Hospital in Gasabo District was analyzed. The results showed that on the district address P value was 0.169 that was not significant. On the sector address P value was 0.291 that was not significant. On the marital status, P value was 0.285 that was not significant. On the occupation, P value was 0.170 that was not significant. On the religion, P value was 0.074 that was not significant. It can be explained that address, religion, occupation, and marital status factors affect the uptake of cervical cancer screening which can cause unsuccessful or failure of cervical cancer screening.

Table 4 Factors associated with uptake of cervical cancer screening (n=262)

Variables	Yes, n(%)	No, n(%)
Not screened because not aware of the service	99 (37.8%)	163 (62.2)
Not screened because never felt ill	211 (80.5%)	51 (19.5)

Source: Primary Data, (2023)

Table 4. indicates that the majority (80.5%) indicated that the main reason for not screening was due to not

feeling ill and a considerable percentage (37.8%) were due to lack of awareness about the service.

Table 5 Multivariable analysis for factors associated with uptake of cervical cancer screening

Variables	Adjusted Odds Ratio	95% Confidence Interval		P value
		Lower	Upper	
Age group in years				
15 to 24	Reference			
25 to 34	1.58	0.96	2.59	0.072
35 and above	1.30	0.75	2.26	0.352
Level of education				
None	Reference			
Primary	1.18	0.62	2.26	0.611
Secondary	1.93	1.07	3.47	0.029
Tertiary	1.99	0.97	4.09	0.061
Overall level of knowledge				
Low	Reference			
High	2.57	1.71	3.85	0.0001

Source: Primary Data, (2023)

Table 5 presents the multiple logistic analysis for factors associated with uptake of cervical cancer screening. Respondents with secondary education

were significantly 1.93 times more likely to screen for cervical cancer (AOR = 1.93; 95%CI = 1.07 - 3.47; p value = 0.029) compared to those with no education.

Cervical cancer screening uptake was 2.57 times more among respondents with a high level of knowledge on cervical cancer than those with low level of knowledge (AOR = 2.57; 95%CI = 1.71 - 3.85; p value <0.001). The results showed that there was statistically significant knowledge of cervical cancer screening among women attending a District Hospital in Rwanda.

5. DISCUSSION

This chapter analyzes quantitative data collected from women attending antenatal care at Kibagabaga Hospital using tables, figures, and text. Primary data was collected from 424 respondents. The prevalence of ever being screened for cervical cancer in a lifetime was 38.2%. However, only 11.8% have been screened in the past two years. The majority (80.5%) indicated that the main reason for not screening was not feeling ill, and a considerable percentage (37.8%) were due to a lack of awareness about the service. In a study conducted in Nepal, cervical cancer screening utilization (16%) is more than four times lower than the national target (70%) in Nepal (8). Compared to the results of this study, the uptake of cervical cancer was 38.2%. It was low uptake because women didn't know the importance of being screened for cervical cancer, so a campaign for capacity building can be organized, and it has been reported that cervical cancer screening utilization (16%) is more than four times lower than the national target of 70%(9). On the overall level of knowledge, 51.9% of participants had a high level of understanding of cervical cancer. Out of 424 participants, 48.1% of the respondents had a high level of knowledge of the risk factors of cervical cancer, 58.3% had a high level of understanding of the signs and symptoms of cervical cancer, and 59.7% had a high level of knowledge of cervical cancer treatment and prevention. According to Damtie *et al* (2023) study findings, 53.3% of participants had heard about cervical cancer and its methods of screening. Only 37.8% of participants in the study were aware of the risks of HPV and having multiple sexual partners for cervical cancer(10) (Ducray *et al.*, 2021). The current research showed that the overall results of women knew the importance of cervical cancer screening was 43.37% while 56.63% didn't know. According to the relationship between variables, the current findings showed a significant association between the Age group in years and the uptake of cervical cancer screening (P-value = 0.034). There was a strong association between the level of education and the uptake of cervical cancer screening (P-value = 0.006

and between the overall level of knowledge and the uptake of cervical cancer screening (P-value = 0.001). Cervical cancer screening uptake was 2.57 times higher among respondents with a high level of knowledge on cervical cancer than those with a low level of knowledge (AOR = 2.57; 95%CI = 1.71–3.85; p-value <0.001). The researcher's findings supported the study conducted by Saira Shahnaz in Pakistan, which showed that lower screening rates might be attributed to a low level of education, particularly in developing countries, and limited knowledge of risk factors, which may mediate the relationship between education and screening rates(Shahnaz *et al.*, 2023). Chang *et al.*, (2017)conducted a study that simultaneously considered age, education, and knowledge levels. They found that combining younger age, higher education, and increased knowledge about cervical cancer significantly increased the likelihood of screening uptake. The observed relationships between age, education, knowledge, and cervical cancer screening uptake, as consistently found in the current research at Kibagabaga Hospital, are in line with the broader literature. This alignment underscores the importance of targeted interventions for specific demographic groups to improve screening rates. The identified associations can guide healthcare professionals and policymakers in tailoring strategies to enhance cervical cancer screening knowledge and uptake among different populations, providing a reliable basis for action.

6. Limitations of the study

This study faced several limitations. Firstly, its findings were confined to a single hospital and its attending participants. Given that hospitals attract patients from various geographic regions, extrapolating the study's conclusions to specific locales proved challenging. Secondly, responses to questions depended solely on self-reporting, necessitating additional independent verification. As noted in previous research, such self-reports are susceptible to bias.

7. Conclusions

This study delved into the determinants of cervical cancer screening uptake among female attendees of Kibagabaga Hospital in Gasabo District, Rwanda. The results illuminate a statistically notable association between age bracket, educational attainment, and familiarity with cervical cancer risk factors and symptoms, with the propensity for undergoing

screening. These findings emphasize the imperative for bespoke educational campaigns and focused interventions aimed at amplifying awareness and facilitating easier access to screening services within this demographic.

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REFERENCES

1. Singh D, Vignat J, Lorenzoni V, Eslahi M, Ginsburg O, Lauby-Secretan B, et al. Global estimates of incidence and mortality of cervical cancer in 2020: a baseline analysis of the WHO Global Cervical Cancer Elimination Initiative. *Lancet Glob Health*. 2023 Feb;*11*(2):e197–206.
2. Makuza JD, Nsanzimana S, Muhimpundu MA, Pace LE, Ntaganira J, Riedel DJ. Prevalence and risk factors for cervical cancer and pre-cancerous lesions in Rwanda. *Pan Afr Med J* [Internet]. 2015 [cited 2024 May 30];*22*. Available from: <http://www.panafrican-med-journal.com/content/article/22/26/full/>
3. Rwanda National Cancer Control Plan. 2020.
4. Riedinger C, Campbell J, Klein WMP, Ferrer RA, Usher-Smith JA. Analysis of the components of cancer risk perception and links with intention and behaviour: A UK-based study. Wagner GG, editor. *PLOS ONE*. 2022 Jan *13*;17(1):e0262197.
5. Atlas SJ, Zai AH, Ashburner JM, Chang Y, Percac-Lima S, Levy DE, et al. Non-visit-based cancer screening using a novel population management system. *J Am Board Fam Med*. 2014;*27*(4):474–85.
6. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin*. 2021 May;*71*(3):209–49.
7. Public Health Bulletin. Pandemic Use of Immediate Postpartum Family Planning Post-Delivery Complications and Quality of Birth Prevention HIGHLIGHTS HIGHLIGHTS Cervical Cancer Screening in Developing Countries Obesity Epidemiology Profile among High School Students Fertility Return after Discontinuing Contraceptive Methods Factors Associated with Non-Adherence to Scizophrenia Medications. 2023.
8. Thapa N, Maharjan M, Petrini MA, Shah R, Shah S, Maharjan N, et al. Knowledge, attitude, practice and barriers of cervical cancer screening among women living in mid-western rural, Nepal. *J Gynecol Oncol*. 2018;*29*(4):e57.
9. Shrestha AD, Andersen JG, Gyawali B, Shrestha A, Shrestha S, Neupane D, et al. Cervical cancer screening utilization, and associated factors, in Nepal: a systematic review and meta-analysis. *Public Health*. 2022 Sep;*210*:16–25.
10. Ducray JF, Kell CM, Basdav J, Haffejee F. Cervical cancer knowledge and screening uptake by marginalized population of women in inner-city Durban, South Africa: Insights into the need for increased health literacy. *Womens Health*. 2021 Jan;*17*:174550652110471.