International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 3, Issue 2, pp. 15-29, June 2025, ISSN: 3043-4467 (Online), 3043-4459 (Print)
DOI: 10.5281/zenodo.15777503

Cervical Cancer Prevention in Rural Namibia: A Cross-Sectional Analysis of Community Knowledge, Attitudes, and Practices in Ohangwena and Kavango West

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ABSTRACT

Background: Cervical cancer remains a leading cause of cancer-related deaths among women globally. In Namibia, cervical cancer often goes undetected despite its prevention through early detection. Women in rural areas face barriers to screening due to limited access to preventive services, inadequate knowledge, and cultural stigmas, leading to high morbidity and mortality.
Objective: The study assessed knowledge, attitudes, and practices regarding cervical cancer prevention among the community of the Ohangwena and Kavango West regions in Namibia.
Method: This cross-sectional study was conducted in various health facilities across these regions. Using purposeful sampling, 228 respondents aged 18-59 participated. Data were collected using a structured questionnaire and analysed with SPSS version 29.
Results: The findings reveal a moderate level of knowledge of cervical cancer but limited awareness about human papillomavirus, with respondents generally showing a positive attitude toward prevention. However, respondents demonstrated poor screening practices.
Conclusion: While the knowledge of cervical cancer is relatively high, significant gaps remain in knowledge regarding human papillomavirus. Positive attitudes towards cervical cancer screening are uplifting. However, structural and cultural barriers impede preventive practices.
Unique Contribution: This study provides localised evidence on cervical cancer prevention by examining the knowledge, attitudes, and practices of rural communities in Ohangwena and Kavango West, Namibia. It adds to the limited research on rural populations and identifies key cultural, informational, and systemic barriers to effective prevention. The findings offer a foundation for context-specific interventions and informed public health efforts to improve community engagement in screening and human papillomavirus awareness.
Key Recommendation: The findings indicate the potential value of implementing community-based education initiatives that emphasise awareness and the importance of regular screening. Furthermore, integrating cervical cancer education into routine primary healthcare services and school health programmes may support efforts to address existing knowledge gaps and promote early prevention practices within rural settings.

Keywords: Cervical Cancer, Knowledge, Attitudes, Practices, Rural Namibia

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INTRODUCTION

Every two minutes, a woman's life is claimed by cervical cancer globally (WHO African Region, 2024a). Cervical cancer, primarily caused by specific strains of the human papillomavirus (HPV), is the leading cause of cancer deaths among women in Africa (World health organisation, 2023). Of the 20 countries with the highest global burden, 18 are located within the Sub-Saharan African (SSA) region (WHO African Region, 2024b). In 2022, the region accounted for 23% of global cervical cancer mortality. If the current trend continues, this percentage might rise to 30% by 2030, a 32% increase from the current level (WHO African Region, 2024b). According to current estimates from the International Agency for Research on Cancer, the age-standardised cervical cancer mortality rate in Southern Africa is 21 per 100,000 women, while the rate in North America and Western Europe is 2 per 100,000 women (International Agency for Research on cancer, 2022). It is anticipated that these disparities are expected to rise. Cervical cancer remains the leading cause of cancer-related deaths in Namibia, accounting for 34.2% of these fatalities (MacBride, 2023a). Cancer of the cervix progresses slowly from the precancer stage to invasive cancer. Thus, unlike most other cancers, cervical cancer is one of the most preventable when detected at its early stages. This presents a hopeful opportunity for change, empowering all stakeholders who play a role in preventing cervical cancer to take proactive steps in prevention (WHO African Region, 2024b).

The larger context of cervical cancer inequality is outside the purview of this article. However, the wide variations in cervical cancer incidence and mortality between low- and middle-income countries (LMICs) such as Namibia and high-income countries (HICs) can be primarily ascribed to disparities in healthcare access more broadly, as well as to obstacles to cervical cancer screening and treatment. These obstacles include such as lack of awareness that cervical cancer is preventable, lack of the HPV vaccine, inadequate clinical and laboratory healthcare workers, poor-resourced health facilities, sociocultural factors, as well as geographic issues.

The prevalence and incidence of cervical cancer in Namibia have exhibited concerning trends, such as a steady increase in the number of new cases and a high mortality rate, similar to other SSA nations (MacBride, 2023b). The significant increase in cervical cancer cases is primarily attributed to the high prevalence of Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), which exceeds 12.6%. This places women in Namibia at a heightened risk for HPV-related cancers, underscoring the urgent need for comprehensive health interventions to address this issue (Ministry of Health and Social Services [Namibia], 2017). Population-based screening with a Papanicolaou (Pap) Smear test and Visual Inspection using Acetic acid (VIA) are crucial secondary preventive measures for cervical cancer. These interventions have been proven to lead to a high cure rate among cervical cancer patients, underscoring the vital role of public health interventions in this field (World Health Organisation, 2023). These screening methods are provided free of charge at the facilities where the study has been carried out. Despite the availability of screening services, cervical cancer remains a public health burden in the country (MacBride, 2023b). To date, Namibia does not offer HPV screening and vaccine services, a primary means of preventing cervical cancer, mainly due to limited resources, high costs of HPV tests, and a lack of laboratory infrastructure.

In addition, there is no fully implemented national policy for HPV DNA testing in the country (Ministry of Health and Social Services [Namibia], 2017).

Studies in various countries, such as Kenya (Gebreegziabher et al., 2024) and South Africa (Omoyeni & Tsoka-Gwegweni, 2022) have identified factors that can predict the utilisation of cervical cancer prevention practices and found that the lack of knowledge of cervical cancer and its prevention is a reason for women not practising screening. A scoping review to collect national cervical cancer policy documents from countries in the World Health Organisation Africa region concluded that women generally have low knowledge about reproductive cancers (Akanda et al., 2022). The report further noted a lack of spousal support, limited community education, and a lack of awareness campaigns, with multiple myths persisting within the communities as reasons for the low screening uptake (Akanda et al., 2022). Moreover, numerous factors that hinder access to screening services and early cancer detection, including lack of information, ignorance, cultural beliefs surrounding reproductive cancer, and barriers within the healthcare system, were also highlighted in another report (Nyambe et al., 2019a). On the contrary, awareness of cervical cancer resulted in positive attitudes and good practices toward screening among Nigerian women (Olubodun et al., 2019). Based on these findings, we assumed that women who are aware of cervical cancer are most likely to practice preventive measures, and men are equally able to support women to do so. Research conducted in Rwanda (Uwimana et al., 2023) found that a woman's partner influenced household decision-making, including healthcare seeking. This evidence suggests that women who believe they have support from their immediate social circles (partner, friends, family) are more likely to be in favour of practising cervical cancer prevention methods.

The knowledge, attitude, and practice of preventing cervical cancer among women have been extensively studied in other countries (Damtie et al., 2023). However, studies of this nature are limited in Namibia, as no published study has assessed the knowledge, attitude, and practice of cervical cancer prevention, specifically in the Ohangwena and Kavango West regions. Additionally, the available literature on cervical cancer does not cover the extent of men's knowledge, attitudes, or their participation in the prevention of cervical cancer. Thus, the specific objective of the study was to assess the knowledge, attitudes, and practices regarding cervical cancer among community members in the Ohangwena and Kavango West regions of Namibia.

METHOD

This study utilised a cross-sectional design to assess knowledge, attitudes, and practices (KAP) related to cervical cancer prevention among community members aged 18–59 in six rural constituencies across Ohangwena and Kavango West regions of Namibia, selected based on high cervical cancer burden and limited screening access. A sample size of 384 was calculated using Cochran's formula for infinite populations, assuming a 50% proportion ($p = 0.5$), a 95% confidence interval (Z_1-$\alpha/2 = 1.96$), and a 5% margin of error. However, only 228 participants were ultimately enrolled due to eligibility constraints and refusals, resulting in an adjusted margin of error of approximately 6.5%. A multi-stage sampling strategy was used: constituencies were selected via the fishbowl simple random sampling method, while health facilities were

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purposively chosen as recruitment sites. Participants were then purposively selected based on inclusion criteria (≥6 months residency and informed consent). Data were collected using an interviewer-administered questionnaire built in Kobo Toolbox, adapted from the CCKP-64 and CAM instruments, and pretested for feasibility and clarity, achieving a Cronbach's alpha of 0.84. Data were exported to Excel, cleaned, and analysed in SPSS v29 using descriptive statistics and logistic regression. Knowledge and attitude scores were categorised as good (≥70%), moderate (50–69%), or poor (<50%). At the same time, practice was assessed through a single item: female participants who had been screened or male participants who had supported screening were classified as having good practice. This methodology provides a replicable model for similar KAP studies in rural, resource-limited settings.

RESULTS

Table 1: Socio-demographic characteristics of study respondents

Predictors	Categories	Frequency	%
Age	18-24	69	30.3
	25-34	77	33.8
	35-44	59	25.9
	45-59	23	10.1
Gender	Male	69	30.3
	Female	159	69.7
Education	Primary/Illiterate	33	14.5
	Secondary	113	49.6
	Tertiary	82	36
Employment status	Unemployed	138	60.5
	Employed/self-employed	90	39.5
Marital status	Single	199	87.3
	Ever married	29	12.7
Contraceptive usage	Yes	187	82
	No	41	18
Number of children	0	57	25
	1 - 5	149	65.4
	6 and above	22	9.6

The table above shows that most respondents were female (69.7%). Regarding age, the majority fell between 18 and 34 (64%), and most respondents had obtained secondary education (50.2%). Furthermore, the findings revealed that more than half of the respondents were unemployed (60.6%), and most lived in rural areas (52. 8%). Almost all the participants were single (87%), and (82. 3%) of the respondents used contraceptives.

Table 2: Knowledge of cervical cancer

Variables	Responses	n (%)
Have you heard of cervical cancer? (n=223)	Yes	211 (94.6)
	No	12 (5.4)
Have you ever heard of HPV? (n=231)	Yes	95 (41.1)
	No	136 (58.9)
If yes, have you heard of the HPV vaccine? (n=232)	Yes	70 (30.2)
	No	162 (69.8)
What are the risk factors for cervical cancer? * (n=336)	Multiple sexual partners	97 (28.9)
	Early sexual activities	39 (11.6)
	Family history of cervical cancer	37 (11)
	Infection with HPV	33 (9.8)
	Oral contraceptives	18 (5.4)
	Smoking cigarette	14 (4.2)
	Do not know	90 (26.8)
	Other factors:	
	Bathing with soap	3 (0.9)
	Abortion	1 (0.3)
	Traditional herbs	3 (0.9)
	Being unlucky in life	1 (0.3)
Signs and symptoms of cervical cancer? * (n=359)	Pain during sex	91 (25.3)
	Bleeding between periods	80 (22.3)
	Foul-smelling discharge	58 (16.2)
	Urinary urgency	12 (3.3)
	Weight loss	26 (7.2)
	Do not know	92 (25.6)
Can Cervical cancer be prevented? (n=228)	Yes	182 (79.8)
	No	46 (20.2)
By which method can it be prevented? * (n=288)	Avoiding multiple sexual partners	82 (28.5)
	Avoid oral contraceptives	15 (5.2)
	Quit smoking	14(4.9)
	HPV vaccination	46 (20.6)
	Do not know	131 (57.5)
Which screening methods detect cervical cancer? * (n=268)	Pap smear test	104 (38.8)
	Visual Inspection with Acetic Acid (VIA)	51 (19)
	Visual Inspection with Lugol's Iodine	6 (2.2)
	Do not know	107(39.9)

* Multiple Responses

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The data indicate that while most respondents (94.6%) were aware of cervical cancer, over half (58.9%) had never heard of HPV, and 26.8% lacked knowledge about risk factors. Although 28.9% recognised having multiple sexual partners as a risk, only 9.8% correctly identified HPV as the causative virus. Additionally, 25.6% reported having no knowledge of cervical cancer symptoms, and only a minority identified key symptoms such as pain during sexual intercourse (25.3%), intermenstrual bleeding (22.3%), and foul-smelling discharge (16.2%). In terms of prevention, 28.5% cited avoiding multiple sexual partners, and 20.6% mentioned HPV vaccination. Notably, 79.8% of respondents were aware that cervical cancer is preventable.

Table 3: Logistic regression model for knowledge about cervical cancer among participants.

Predictor variables	**Categories**	**COR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Age (ref: 18-24)			**0.137**		
	25-34	1.127 (0.569 - 2.231)	**0.732**		
	35-44	0.522 (0.233 - 1.166)	**0.113**		
	45-59	0.439 (0.134 - 1.44)	**0.175**		
Gender (ref: Male)	Female	0.999 (0.537 - 1.861)	0.999		
Education (ref: Primary/Illiterate)			<0.001		0.008
	Secondary	2.609 (0.733 - 9.28)	0.139	1.203 (0.294 - 4.93)	0.797
	Tertiary	9.07 (2.564 - 32.086)	0.001	3.479 (1.015 - 14.688)	0.045
Employment status (ref: Unemployed)	Employed/Self-employed	0.763 (0.421 - 1.382)	0.372		
Residence (ref: Rural/village)	Urban	4.11 (2.213 - 7.632)		2.547 (1.266 - 5.125)	0.009
Marital status (ref: Single)	Ever married	0.897 (0.378 - 2.129)	0.805		
Contraceptive usage (ref: No)	Yes	1.111 (0.52 - 2.373)	0.786		
Number of children (ref: 0)			<0.001		0.001
	1 - 5	0.333 (0.176 - 0.631)	0.001	0.354 (0.167 - 0.75)	<0.001
	6 and above	0.049 (0.006 - 0.392)	0.004	0.112 (0.012 - 1.067)	<0.001
HIV testing (ref: No)	HIV testing	1.204 (0.123 - 11.785)	0.873		
Religious group (ref: Muslim/Others)	Christian	0.932 (0.504 - 1.724)	0.822		

AOR: Adjusted odds ratio; COR: Crude odds ratio; 95% CI: 95% confidence interval

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Table 3 presents the respondents' significant predictors of higher knowledge regarding cervical cancer prevention. Individuals with tertiary education were significantly more likely to possess high knowledge than those with primary or no education (AOR = 3.479, 95% CI: 1.015–14.688, *P* = 0.045). Similarly, urban dwellers demonstrated higher knowledge levels than rural counterparts (AOR = 2.547, 95% CI: 1.266–5.125, *P* = 0.009). Parity emerged as a notable factor, with participants having 1–5 children being 65% less likely to exhibit high knowledge (AOR = 0.354, 95% CI: 0.167–0.750, *P* < 0.001) and those with six or more children being nearly 89% less likely (AOR = 0.112, 95% CI: 0.012–1.067, *P* < 0.001), compared to those without children. In contrast, marital status, employment status, and HIV testing history were not significantly associated with knowledge levels.

Table 4: Attitude on cervical cancer prevention among participants.

Variables	**Total (N)**	**Strongly disagree n(%)**	**Disagree n(%)**	**Neutral n(%)**	**Agree n(%)**	**Strongly agree n(%)**
All women have an equal chance of developing cervical cancer	228	10 (4.4)	38 (16.7)	12 (5.3)	***111 (48.7)***	57 (25)
Cervical cancer can be detected early by screening	221	2 (0.9)	10 (4.5)	8 (3.6)	***139 (62.9)***	62 (28.1)
Cervical cancer screening causes no harm to women	225	22 (9.8)	65 (28.9)	16 (7.1)	***82 (36.4)***	40 (17.8)
It is imperative to consult a doctor if there is bleeding between periods	220	5 (2.3)	2 (0.9)	6 (2.7)	***127 (57.7)***	80 (36.4)
HPV vaccination can prevent cervical cancer	207	13 (6.3)	9 (4.3)	48 (23.2)	***97 (46.9)***	40 (19.3)
All women who develop cervical cancer must have their wombs removed	222	***58 (26.1)***	56 (25.2)	35 (15.8)	41 (18.5)	32 (14.4)
Cervical cancer would threaten a relationship with a sexual partner	224	34 (15.2)	45 (20.1)	29 (12.9)	***65 (29)***	51 (22.8)
I prefer a female health worker to conduct a cervical examination	225	28 (12.4)	25 (11.1)	26 (11.6)	***84 (37.3)***	62 (27.6)

The table above highlights respondents' attitudes toward cervical cancer prevention, showing generally positive views. Most recognised the importance of early screening (91%) and consulting a doctor for intermenstrual bleeding (94.1%). Additionally, 66.2% acknowledged HPV vaccination as a preventive measure. However, misconceptions persisted, with over half believing cervical cancer requires a hysterectomy (51.3%) and that it negatively impacts romantic relationships (51.8%). Most respondents (64.9%) preferred female healthcare providers

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for screening, while opinions on the procedure's safety were divided, with 54.2% perceiving it as harmless.

Practice of cervical cancer screening

Only 37.3% of women who responded to this question had been screened, and 40% of men had supported a female figure in their lives to screen for cervical cancer, as shown in Figures 1 and 2 below.

Figure 1: Screened women

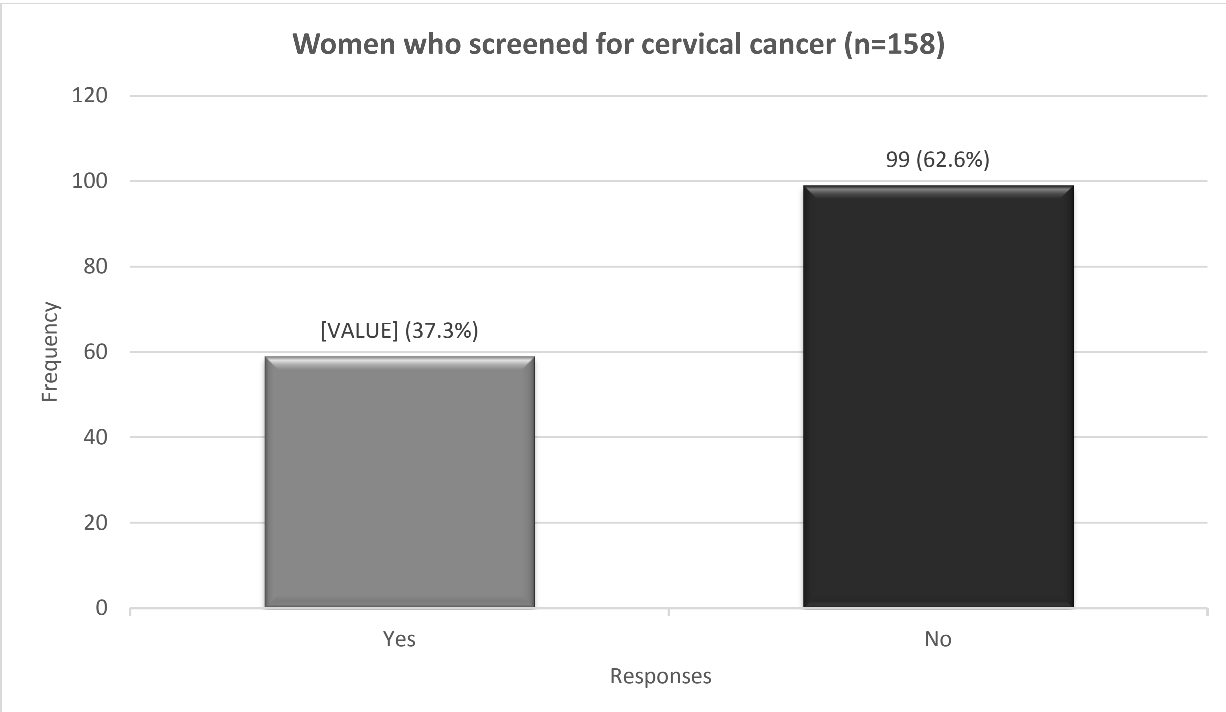

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Figure 2: Men who supported women to be screened.

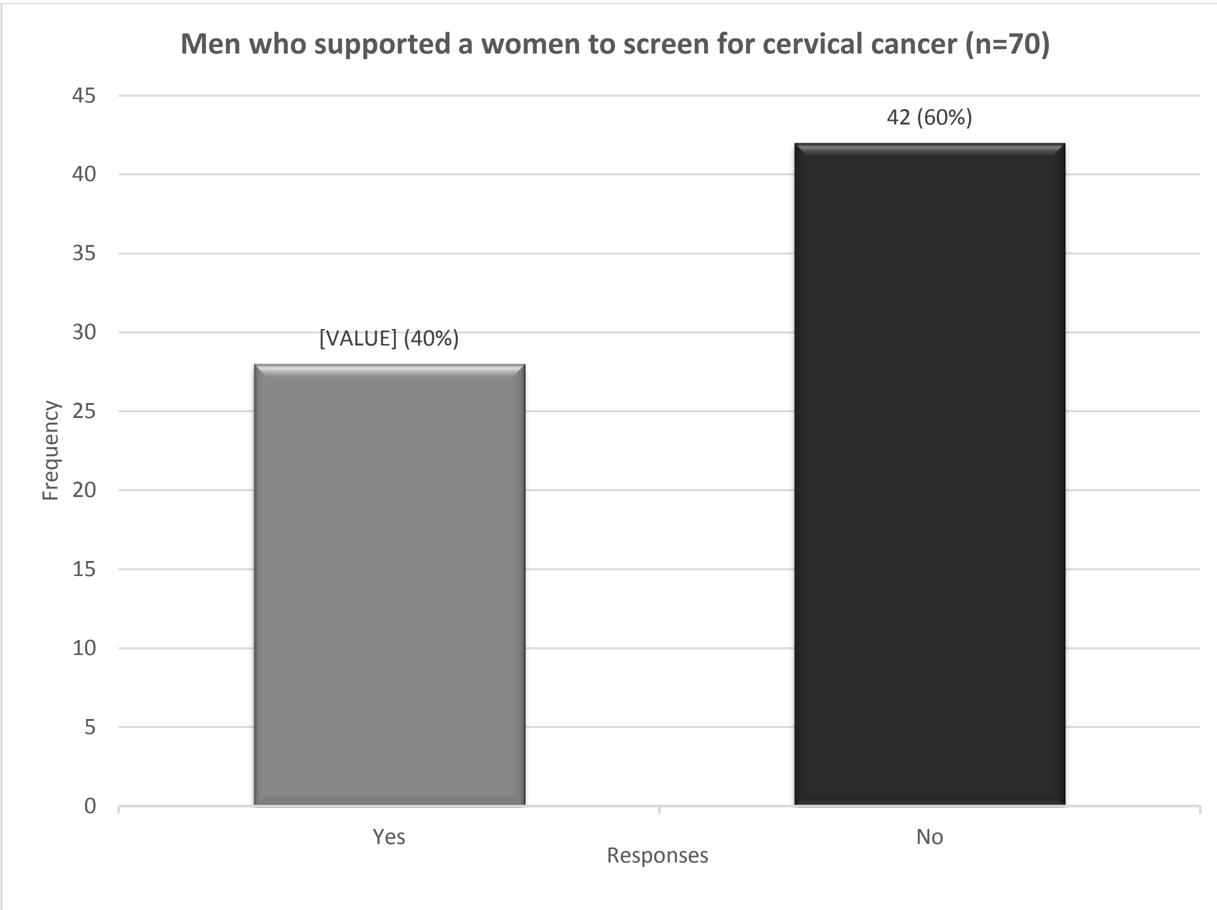

Table 5: Overall score of knowledge, attitude, and practices towards cervical cancer prevention

Variable	Category	Count	Percentage %
Knowledge of cervical cancer prevention (n=228)	Poor knowledge	6	2.6%
	Moderate Knowledge	143	62.7%
	Good Knowledge	79	34.6%
Attitude toward cervical cancer prevention (n=109)	Negative attitude	10	9.2%
	Positive attitude	99	90.8%
Practice towards cervical cancer prevention (n=231)	Poor practice	184	79.7%
	Moderate practice	47	20.3%

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Table 5 shows that most respondents had moderate knowledge (62.7%) about cervical cancer prevention, while 34.6% had good knowledge and only 2.6% had poor knowledge. Attitudes were largely positive among respondents (90.8%), but practices were poor, with 79.7% of respondents showing poor prevention practices and only 20.3% demonstrating moderate practice.

DISCUSSION

Knowledge, attitudes, and practices of any community about a disease, including cervical cancer, offer essential opportunities for comprehensive prevention and control strategies of the disease. Thus, this study assessed participants' knowledge, attitudes, and practices regarding cervical cancer prevention.

The data showed that most respondents had a moderate level of knowledge, 62.72% regarding the risk factors, signs and symptoms, and methods of preventing cervical cancer in the Ohangwena and Kavango West regions. This level of awareness suggests a potentially improved capacity among women to recognise symptoms early and seek timely medical intervention, while also enabling men to provide informed support. This study's heightened knowledge of cervical cancer mirrors observations from similar studies conducted in Zambia (Nyambe et al., 2019b). The consistency in various settings reflects a growing awareness of cervical cancer, probably driven by community health education efforts, increased advocacy, and access to information through social media. However, this finding is lower than that of a similar study done in southern Morocco among female Anti-Retroviral Therapy (ART) attendants (Arechkik et al., 2023). This could be due to the participants' exposure to health information through healthcare workers during their routine checkups and follow-ups for ART services. The moderate knowledge observed in the context of this study is attributed to the limited integration of cervical cancer education into primary healthcare services outside of HIV care settings.

Moreover, despite a relatively high level of knowledge of cervical cancer among the respondents, the findings of this study highlight critical gaps in knowledge regarding HPV, a virus commonly responsible for about 99% of all cervical cancer cases. This suggests that while awareness campaigns may be successfully conveying general information about cervical cancer, they may not be adequately addressing its primary cause. These findings are consistent with those reported by Ghosh et al. (2024), who found similarly limited understanding of HPV and its vaccine among women. Likewise, Petersen et al. (2022) observed that in Sub-Saharan Africa, general awareness of cervical cancer often coexists with poor knowledge of HPV. In addition, a previous study in Sub-Saharan Africa also indicates that awareness of HPV is low despite general knowledge of cervical cancer being relatively high (Petersen et al.,2022). Fascinatingly, many respondents believed that cervical cancer could be prevented, yet only a small proportion recognised HPV vaccination as a preventive measure. The result could be attributed to the absence of HPV vaccination services in the Namibian public health facilities. This finding is nearly consistent with a study in which women were reported to be aware of cervical cancer but lacked knowledge of prevention strategies such as HPV vaccination (Oleribe et al., 2019). This study contributes to existing literature by underscoring the need for more integrated and specific education on HPV and its vaccine, especially in contexts where it is not routinely offered through public health systems.

In addition, education at the tertiary level emerged as a critical predictor of higher knowledge. Thus, targeted health educational interventions tailored to people with lower educational achievements are essential when addressing knowledge disparities. Additionally, the number of times a woman gave birth to viable offspring highly influenced knowledge levels, as participants who had 1-5 children were found to be less knowledgeable than those without children. Those with more than five children were even less likely to demonstrate higher knowledge. This inverse association may reflect the tight priorities and resource challenges faced by more prominent families, which can limit their engagement with health information and health service accessibility (Zibako et al., 2022)**.** Future interventions should consider the unique constraints of high parity individuals, with the potential integration of cervical cancer education into maternal and child health programmes.

The data revealed that, although a substantial proportion of respondents demonstrated a positive attitude, a minority exhibited a negative attitude. For instance, most participants agreed that cervical cancer could be detected early by screening (91%) and that all women had an equal chance of developing cervical cancer (73.7%). Previous studies have shown that attitudinal factors, such as feeling susceptible to cervical cancer, affect the uptake of screening services (Kussia et al., 2024; Rasul et al., 2022). The generally favourable attitudes observed in this study and relatively high knowledge levels present a valuable opportunity to scale up cervical screening programmes in northern Namibia. It is plausible that increasing access to screening services, especially in remote and underserved areas, could translate this positive outlook into action. However, contrasting evidence from other studies shows that even when screening opportunities are made available, women may still refrain due to non-informational barriers such as stigma, fear of a cancer diagnosis, distance to health facilities, and discomfort with screening procedures (Mengesha et al., 2023; Petersen et al., 2022). Thus, cervical cancer awareness and prevention programmes should continually seek to influence women's and men’s attitudes about cervical cancer and screening. In addition, interventions should be designed to accommodate culturally sensitive health education campaigns that exclusively engage traditional leaders and address local beliefs.

It is evident from the data that, whilst respondents exhibited good knowledge and a positive attitude, this was not entirely reflected in their practice. The screening practices for cervical cancer were reported to be poor among the respondents in this study. This suggests that this might be the result of inadequate health campaigns for cervical cancer, highlighting challenges in translating awareness of cervical cancer prevention into practice. A survey conducted among females residing in Al Ain city of the United Arab Emirates (UAE) presented similar results, in which (31.3%) of women were classified with inadequate practice towards cervical cancer screening (Elbarazi et al., 2023). The findings highlight the need to strengthen health education and move accessibility initiatives closer to the people to help improve participation in efforts toward cervical cancer prevention.

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CONCLUSION

Based on the findings, this study concludes that while the knowledge of cervical cancer is relatively high, significant gaps remain in knowledge regarding HPV and HPV vaccinations. Positive attitudes towards cervical cancer screening are uplifting. However, structural and cultural barriers impede preventive practices. When designing community-based prevention interventions, cultural and familial factors must be considered to engage both women and their families to improve acceptance and overall participation in cervical cancer prevention programmes. The study's overall results provide a base for healthcare workers and policymakers to tailor-make interventions that advance awareness, challenge misbeliefs, and increase participation in prevention measures.

Ethical clearance

Ethical clearance was sought and obtained from the Ministry of Health and Social Services in Namibia, and the participants used in the study. They were made to understand that the exercise was purely for academic purposes, and their participation was voluntary.

Acknowledgement

We acknowledge the respondents who participated in the study for their cooperation and support.

Sources of funding

The study was not funded.

Conflict of interest

The authors declare that they have no conflicts of interest.

Authors contributions

Elizabeth Ndakukamo conceived the study, including the design, and wrote the original manuscript, while Dr. Mahalie and Dr. Panduleni Hailonga-Van Dijk guided data collection and analysis. All the authors read and approved the final manuscript for publication in its current form.

Availability of data and materials

The datasets on which conclusions were made for this study are available on reasonable request.

Citation

Ndakukamo, E. K., Mahalie, R., & Hailonga, P. (2025). Cervical cancer prevention in rural Namibia: A cross-sectional analysis of community knowledge, attitudes, and practices in Ohangwena and Kavango West. *International Journal of Sub-Saharan African Research, 3*(2), 15-29

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International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 3, Issue 2, pp. 15-29, June 2025, ISSN: 3043-4467 (Online), 3043-4459 (Print)
DOI: 10.5281/zenodo.15777503

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