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Article

Cervical Cancer Screening in a Rural South African Context: The Interplay of Awareness, Cultural Beliefs, and Health-Seeking Behavior: Pilot Study

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Abstract

Background/Objectives: Cervical cancer is one of the most common cancers among women of reproductive age, with 80% of the cases occurring in developing countries. Cervical cancer is largely preventable by effective screening programs. This study assessed the knowledge, attitudes, cultural beliefs, and screening practices related to cervical cancer among women in the rural community of Lutubeni, Eastern Cape Province. **Methods:** A descriptive cross-sectional study was conducted among 95 women aged ≥ 25 years attending Lutubeni Clinic. Data were collected using a structured, validated questionnaire covering demographics, reproductive health, knowledge of cervical cancer, attitudes, cultural perceptions, and screening practices. Statistical analysis involved descriptive summaries, chi-square tests, and multinomial logistic regression. **Results:** Most participants exhibited poor knowledge of cervical cancer symptoms (47.4%) and risk factors (61.1%), with only 3.2% demonstrating good overall knowledge. Vaginal bleeding (60.0%) and foul-smelling discharge (50.5%) were the most recognized symptoms. Only 40.0% were aware of HPV vaccination. While 87.4% knew about cervical cancer screening, only 55.8% had ever been screened. Of these, 43.2% had screened only once, primarily at the clinic (33.7%), mostly initiated by health professionals (41.1%). Positive attitudes toward screening were observed in 52.6%, while 88.4% held cultural beliefs that hinder open discussion about sexual health. Statistically significant factors associated with screening uptake included educational level ($p = 0.047$), knowledge of symptoms ($p = 0.04$), risk factors ($p < 0.0001$), prevention ($p < 0.0001$), and treatment ($p = 0.001$), as well as attitudes ($p < 0.0001$). Independent predictors of poor screening practice were holding a diploma (OR = 0.04; $p = 0.042$), good preventive knowledge (OR = 0.02; $p = 0.012$), and negative attitudes (OR = 36.22; $p = 0.005$). **Conclusions:** Despite high awareness, limited knowledge and negative attitudes, influenced by cultural norms, impede cervical cancer screening in rural communities.

Keywords: cervical cancer; cultural beliefs; knowledge; attitudes; screening; health-seeking

1. Introduction

Cervical cancer is cancer affecting the cervix, an organ that connects the uterus and the vagina in women [1]. Globally, Cervical cancer is the fourth most common cancer in women, with around 660 000 incident cases and fatalities amounting to 350,000 in 2022 and accounts for 22% of all cancers in sub-Saharan Africa (SSA) [2–4]. It is the most common gynecological cancer worldwide with the low- and middle-income countries bearing a disproportionate disease burden as a result of wide inequalities in human papillomavirus (HPV) vaccination exposure, socioeconomic factors and access to preventive strategies [5]. Although cervical cancer is basically preventable through effective

interventions, most women seek help late when the disease has reached an advanced stage and irreparable eventually leading to death [6–8].

Global analysis from 185 countries found that the highest incidences were in Eastern, Western, and Southern African countries. It further revealed that except for Northern Africa, cervical cancer is the leading cause of cancer-related death in women in the African region [9,10]. According to global mortality statistics, Africa bears the greatest burden, with 24.55% mortality rate [10]. In SSA, incident and mortality rates of cervical cancer is 35 and 22.5 per 100,000 women annually as compared to a lower figure of 6.6 and 2.5 per 100,000 women, respectively, in North America [11]. In SSA, 66% of cervical cancers are diagnosed at an advanced stage as compared to 25% in the UK, thus giving an insight into the disparity in age standardised relative survival (ASRS) between SSA and high-income countries (HICs) [12]. The incidence and mortality rates of cervical cancer in South Africa are among the highest in SSA. Of the 117,316 incident cases and 76,745 fatalities recorded within the African region in 2020, 10,702 cases and 5,870 associated deaths were reported from South Africa alone [13]. In contrast, a total of 4,664 deaths due to female breast cancer were recorded in that same year, making cervical cancer the leading cause of cancer-related death among women in South Africa [13]. A study by the South African Medical Research Council reported cervical cancer as the most common cancer among females in the Eastern Cape, with a prevalence of 35% [14].

The etiology of cervical cancer is chronic human papillomavirus (HPV). Different types of HPV have been identified including a dozen of them linked with cervical cancer development infection with 70% of cases associated with HPV16 and 18 [4,10,15]. Although HPV infection leads to cervical cancer, other risk factors include HIV infection, oral contraceptives, early sexual escapades, multiple sexual associates, compromised immune system and smoking [4,10,16]. Despite the magnitude of the disease, awareness is generally low globally but a worse situation in LMICs [16]. Evidence suggests that increased awareness of signs, symptoms and risk factors of cervical cancer leads to increased uptake of cervical screening, early detection and subsequently leading to timely help-seeking behaviour and prevention [17]. Being asymptomatic in its early stages coupled with a long latent phase, screening is a highly essential preventative measure which detects precancerous cell changes on the cervical lining before progression to invasive cancer, thus reducing the burden of disease [5,15]. Although cytology-based pap smear remains the gold standard for screening to identify precursors, other methods include colposcopy and HPV-DNA testing as an alternative screening method is allowed according to the 2017 South African guidelines [5,15,16]. Screening using pap smear 3–5 years with appropriate follow-up can lead to the reduced risk of cervical cancer by 80% [3,18].

In 2020, the World Health Organization launched a global initiative aimed at accelerating eradication of cervical cancer. The 2030 targets of 90–70–90 aim that by age 15, 90% of girls would have been vaccinated with HPV vaccine, within ages 35 and 45, 70% of women would have been screened and 90 % of women with precancerous lesions or invasive cancer would have been treated [4,5].

Different factors such as awareness of cervical cancer, level of education and cultural and religious beliefs influence women's uptake of screening programs and services in developing nations. Culture and beliefs influence a person's knowledge and perception of cancer screening, contributing to low participation in cervical screening programs and a crucial predictor of health-seeking behavior [3,6]. Cultural diversity and socio-economic factors are attitudinal barriers to women's access to cervical screening services [19]. Attitudes play an important role in formulating health-seeking behavior. A negative attitude is associated with low uptake of screening services for the prevention and treatment of cervical cancer among women in sub-Saharan Africa [19]. Hence the study sought to assess knowledge, attitudes, and cultural beliefs regarding cervical cancer screening among women attending primary healthcare centers in a rural community in the Eastern Cape.

2. Materials and Methods

2.1. Study design, Setting and Population

This was a community-based descriptive cross-sectional study conducted at Lutubeni Clinic, a primary healthcare facility in the rural community of Mqanduli, Oliver Tambo District, Eastern Cape Province, South Africa. The clinic serves residents of Lutubeni and neighboring villages, including Mampingeni, Mandqobe, Gomatana, Haji, Khawula, and Mbozisa. The target population included women aged 25 years and older who had resided in Lutubeni for at least one year. The study population comprised female clients who attended the clinic during the data collection period. A convenience sampling technique was employed to recruit eligible participants based on their availability and willingness to participate. Females aged ≥ 25 year, Residents of Lutubeni for ≥ 1 year were included in the recruitment while Male, Critically ill participants and individuals unwilling or unable to provide consent were excluded from the study.

2.2. Sample Size Calculation

The sample size was calculated using the formula: $n = Z^2 \alpha * p(1-p) / e^2$. Where $Z = 1.96$ for a 95% confidence interval, $p = 0.355$ (estimated cervical screening prevalence in South Africa) [1], and $e = 0.10$ (margin of error). The estimated sample was 88 participants; accounting for a 15% non-response rate, the final target was 102 participants.

2.3. Data Collection, Management and Analysis

Data were collected over four weeks (5–26 October 2022) using a validated structured questionnaire comprising five sections: (A) sociodemographic characteristics, (B) reproductive and lifestyle factors, (C) knowledge about cervical cancer and screening, (D) attitudes toward screening, and (E) cultural beliefs. The instrument was developed from previously published studies [2,3] translated into isiXhosa, and back-translated into English for accuracy. Data collection was conducted by nine trained medical students from Walter Sisulu University during Community-Based Education and Service (COBES) rotations.

2.4. Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 27 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized as means \pm standard deviations or medians with interquartile ranges (IQR), depending on data distribution. Categorical variables were described as frequencies and percentages. Associations between sociodemographic, knowledge, and attitude variables and screening practice were tested using the Chi-square or Fisher's exact test. Statistically significant variables ($p < 0.05$) were entered into a multinomial logistic regression model to identify independent predictors of screening practice. Knowledge Scoring: Correct answers received 1 point; incorrect answers received 0. Composite knowledge scores were calculated and categorized using Modified Bloom's criteria: good (80–100%), moderate (50–79%), and poor ($< 50\%$). Attitude Scoring: Attitudes were assessed using a 5-point Likert scale. Total scores were calculated, and participants were dichotomized into positive ($<$ mean score) and negative (\geq mean score) attitude categories. Screening Practice: Defined as "good" if participants had ever undergone cervical cancer screening; otherwise, "poor."

3. Results

A total of 98 women aged 25 years and older participated in the study, yielding a response rate of 96.1%. After excluding three questionnaires due to missing critical data (age and cervical screening status), the final sample comprised 95 participants, which exceeded the minimum required sample size ($n = 88$). Only marital status had incomplete responses ($n = 4$ missing).

The results presented below include analyses of participants’ sociodemographic, reproductive, and lifestyle characteristics, along with their knowledge, attitudes, and cultural beliefs regarding cervical cancer and screening. Factors influencing cervical cancer screening practices among women in Lutubeni were also assessed.

3.1. Sociodemographic Characteristics of the Study Population

The study sample comprised 95 women aged 25–68 years (median: 39; IQR: 30–48), with the largest proportion (43.2%) aged 25–35 years. The majority self-identified as Christian (94.7%), while smaller proportions reported African spirituality (3.2%) or Zionist beliefs (2.1%). Most participants were either single (42.1%) or married (41.1%). Educational levels varied, with 42.1% having completed secondary education, and 11.6% possessing diploma or degree qualifications. Unemployment was prevalent (30.5%), alongside notable proportions of housewives (26.3%) and government employees (25.3%). Monthly income was predominantly below 2000 Rands(South Africa currency), (60%), and nearly all respondents (98.9%) identified as heterosexual.

Table 1. Socio-demographic characteristics of the sample population.

Variable	Category	Frequency (n=95)	Percentage (%)
Age groups	25-35 years	41	43.2
	36-46 years	25	26.3
	47-57 years	18	18.9
	58-68 years	11	11.6
	Median (IQR): 39 (30 – 48) years; Min-Max: 25 – 68 years		
Religion	Christianity	90	94.7
	African spirituality	3	3.2
	Zion	2	2.1
	Single	40	42.1
Marital status	Married	39	41.1
	Widowed	6	6.3
	Divorced	3	3.2
	Cohabitation	2	2.1
	Separated	1	1.1
	Decline	4	4.2
Education Status	Secondary school	40	42.1
	Diploma	16	16.8
	Primary school	16	16.8
	No formal education	12	12.6
	Diploma/Degree	8	8.4
	Degree	3	3.2
Occupation	Unemployed	29	30.5
	House wife	25	26.3
	Government	24	25.3
	Self-employed	11	11.6
	Student	6	6.3
Monthly Income	R <2000	57	60.0
	R >2000	34	35.8
Sexual Orientation	Heterosexual	94	98.9
	Homosexual	1	1.1

3.2. Reproductive Characteristics of 95 Women Residing in Lutubeni

The reproductive characteristics of 95 women residing in Lutubeni revealed that almost all participants (98.9%) had previously engaged in sexual activity, with the median age at sexual debut

being 18 years (IQR: 16–21; range: 10–30 years). Over half (51.6%) reported initiating sexual activity between ages 15 and 18, while 7.4% reported initiation before age 15. A history of casual sexual partnerships was reported by 45.3% of participants, whereas 53.7% reported having only steady partners. Modern contraceptive use was high (78.9%), with a median usage duration of 7 years (IQR: 5–10). The majority (40.0%) had used contraceptives for 5–9 years, 21.1% for ≥10 years, and 16.8% for less than 5 years. Only 2.1% reported a maternal history of cervical cancer. Condom use was reported by 75.8% of participants. A small proportion (12.6%) were current cigarette smokers, and 46.3% reported alcohol consumption.

Table 2. Reproductive characteristics of 95 women residing in Lutubeni.

Variable	Category	Frequency (n=95)	Percentage (%)
Ever had Sex	Yes	94	98.9
	No	1	1.1
Age of First Sex (Years)	15-18 years	49	51.6
	>18 years	37	38.9
	<15 years	7	7.4
	Median (IQR):18 (16-21) years; Min-Max: 10-30 years		
History of Casual Sex	No	51	53.7
	Yes	43	45.3
Use of Contraceptive pills or injection	Never had sex	1	1.1
	Yes	75	78.9
	No	19	20.0
	Never had sex	1	1.1
Duration of Using Oral Contraceptives	5-9 years	38	40.0
	≥10 years	20	21.1
	<5 years	16	16.8
	Median (IQR): 7 (5-10) years; Min-Max: 1-20 years)		
My mother had cervical cancer	No	93	97.9
	Yes	2	2.1
History of Condom	Yes	72	75.8
	No	22	23.2
History of Cigarette Smoking	Never had sex	1	1.1
	No	83	87.4
History of Alcohol Consumption	Yes	12	12.6
	No	51	53.7
	Yes	44	46.3

3.3. Knowledge Level About Cervical Cancer and Screening Among the Participants.

Out of the 95 participants, the majority demonstrated poor knowledge of cervical cancer symptoms (47.4%) and risk factors (61.1%). 24.2% reported good knowledge of symptoms with vaginal bleeding (60%) and foul-smelling vaginal discharge (50.5%) being the most recognized symptoms, while pain during intercourse was less commonly identified (45.3%),47.4% acknowledged multiple sexual partners as a risk, fewer participants recognized associations with HPV infection (24.2%), multiparity (27.4%), early sexual debut (30.5%), long-term oral contraceptive use (31.6%), or cigarette smoking (41.1%). 32.6% reported having no knowledge of any risk factors while 54.7% had poor knowledge and only 40% were aware of HPV vaccination as a preventive measure. Avoidance of multiple sexual partners was (64.2%), early screening (68.4%) was more commonly known preventive strategies and 14.7% reported no knowledge of prevention methods. Awareness of cervical cancer screening was 87.4% demonstrating good knowledge and 90.5% acknowledging the existence of screening programs. Overall, the composite knowledge score revealed that 46.3% of participants had poor knowledge, 50.5% had moderate knowledge, and only 3.2% demonstrated good knowledge regarding cervical cancer and its screening.

Table 3. Knowledge level about cervical cancer and screening.

Knowledge of Cervical cancer	Response n (%), n=95	
	Yes	No
Knowledge of symptoms of cervical cancer: Poor knowledge 45 (47.4%), Moderate knowledge 27 (28.4%), Good knowledge 23 (24.2%)		
Vaginal bleeding	57 (60%)	38 (40%)
Vaginal foul-smelling discharges	48 (50.5%)	47 (47.9%)
Pain during sex	43 (45.35)	52 (54.7%)
Knowledge related to the risk factor of Cervical cancer: Poor knowledge 58 (61.1%), Moderate knowledge 26 (27.4%), Good knowledge 11 (11.6%)		
Acquiring HPV	23 (24.2%)	72 (75. 8%)
Multiple sex partner	45 (47.4%)	50 (52.6%)
Multi parity	26 (27.4%)	69 (72.6%)
Early sexual intercourse	29 (30.5%)	66 (69.5%)
Long-term oral contraceptive use	30 (31.6%)	65 (68.4%)
Cigarette smoking	39 (41.1%)	56 (58.9%)
Do not know the risk factors	31 (32.6%)	64 (67.4%)
Knowledge related to prevention: Poor knowledge 52 (54.7%), Moderate knowledge 4 (4.2%), Good knowledge 39 (41.1%)		
Vaccination for HPV	38 (40%)	57 (60%)
Avoid multiple sex partner	61 (64.2%)	34 (35. 8%)
Avoid long-term use of oral contraceptives	40 (42.1%)	55 (57.9%)
Early screening	65 (68.4%)	30 (31.6%)
No smoking	44 (46.3%)	51 (53.7%)
Do not know the prevention	14 (14.7%)	81 (85.3%)
Knowledge related to the treatment of cervical cancer: Poor knowledge 42 (44.2%), Moderate knowledge 41 (43.2%), Good knowledge 12 (12.6%)		
Surgery	68 (71.6%)	27 (28.4%)
Chemotherapy	57 (60%)	38 (40%)
Radiotherapy	15 (15. 8%)	80 (84.2%)
Do not know	20 (21.1%)	75 (78.9%)
Knowledge of cervical cancer screening: Poor knowledge 8 (8.4%), Moderate knowledge 4 (4.2%), Good knowledge 83 (87.4%)		
Is there screening for cervical cancer	86 (90.5%)	9 (9.5%)
Screening service is available at the local clinic	84 (88.4%)	11 (11.6%)
Knowledge related to screening interval: Poor knowledge 66 (69.5%), Moderate knowledge 27 (28.4%), Good knowledge 2 (2.1%)		
Every year	31 (32.6%)	64 (67.4%)
Every three years	22 (23.2%)	73 (76.8%)
Every five year	12 (12.6%)	83 (87.4%)
Do not know	28 (29.5%)	67 (70.5%)
Knowledge related to screening eligibility: Poor knowledge 48 (50.5%), Moderate knowledge 28 (29.5%), Good knowledge 19 (20.0%)		
Women 30 years of age and older	58 (61.1%)	37 (38.9%)
Prostitute	47 (45.5%)	48 (50.5%)
Elderly women	44 (46.3%)	51 (53.7%)
Do not know	21 (22.1%)	74 (77.9%)
Knowledge related to cervical cancer screening procedures		
VIA	1 (1.1%)	94 (98.9%)
PAP smear	84 (88.4%)	11 (11.6%)
Do not know	11 (11.6%)	84 (88.4%)
Composite Knowledge score		
Poor Knowledge		44 (46.3%)
Good knowledge		3 (3.2%)
Moderate knowledge		48 (50.5%)

3.4. Overall Knowledge Level and Age Group of the 95 Participants from the Lutubeni Community.

Poor knowledge was highest among participants between 58 years and 68 years, moderate among those of the age group 36 years to 46 years, and good knowledge among the 47 years to 57 years age group.

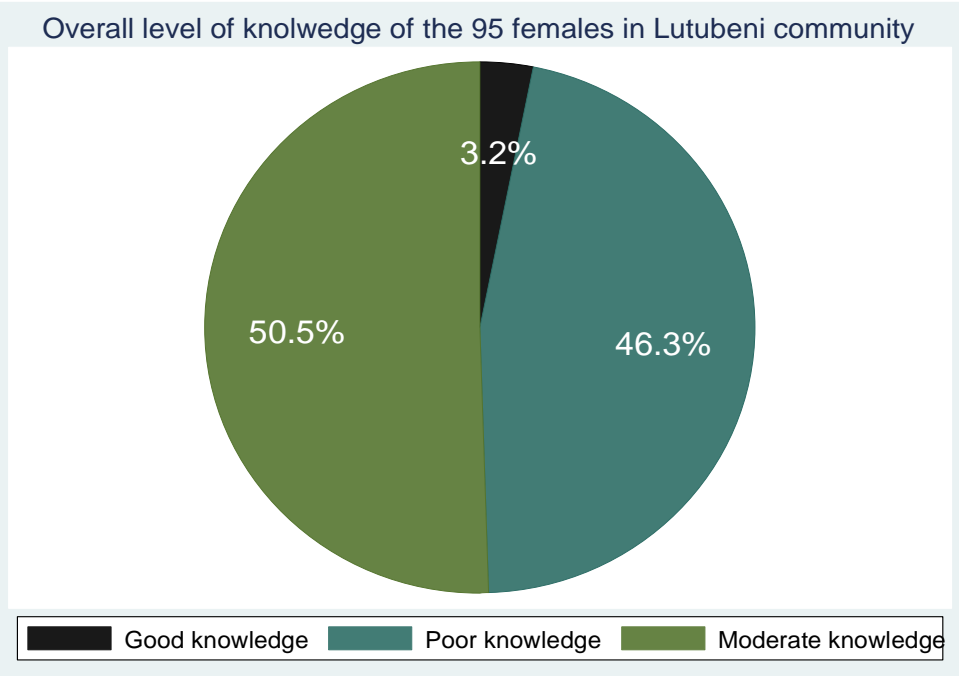


Figure 1. Overall knowledge level of the 95 participants from the Lutubeni community.

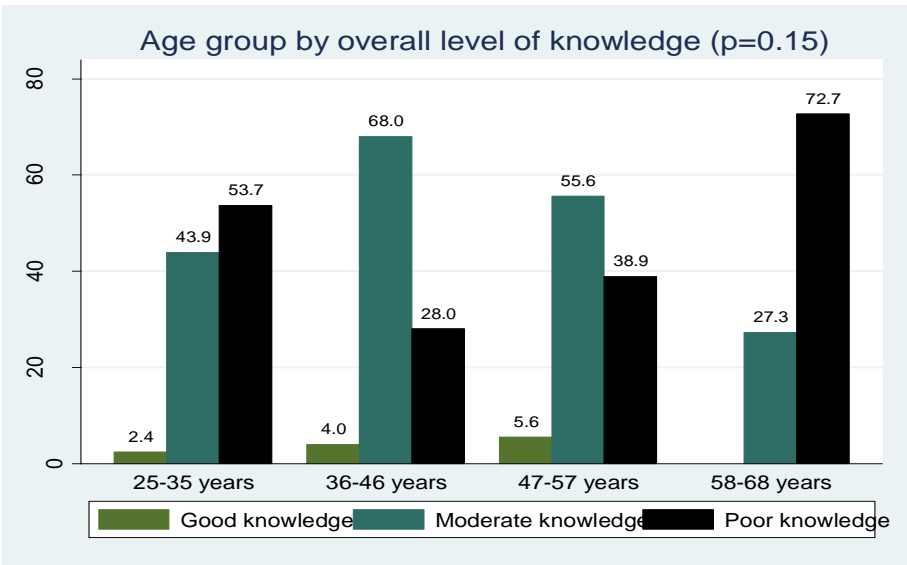


Figure 2. Age group by overall level of knowledge.

3.5. Attitude of the Participants Towards Cervical Cancer Screening

Analysis of the participants’ attitudes is presented in Table 4. From all the participants, more than two-third (67.4%) strongly agreed that cervical cancer is becoming a problem in south Africa and 38 (40.0%) of them agreed that it is the leading cause of cancer-related death among women in South Africa. The majority agreed that any adult woman can acquire cervical cancer (43.2%) and that cervical cancer cannot be transmitted from one person to another (46.3% n=44). Most (50.5%) of

them agreed that screening helps in the prevention of cervical cancer and a high proportion (38.9%) agreed that screening causes harm.

Table 4. Attitude of the 95 participants from the Lutubeni community towards cervical cancer and screening.

VARIABLES USED TO MEASURE ATTITUDE	SA	A	NADA	DA
	n (%)	n (%)	n (%)	n (%)
Cervical cancer is a highly prevalent disease among women in South Africa	64(67.4)	20(21.1)	6(6.3)	5(5.3)
Cervical cancer is the leading cause of cancer-related death among women in South Africa	30(31.6)	38(40.0)	14(14.7)	13(13.7)
Any adult woman including you can acquire cervical cancer	35(36.8)	41(43.2)	16(16.8)	3(3.2)
Cervical cancer cannot be transmitted from one person to another	26(27.4)	44(46.3)	13(13.7)	12(12.6)
Screening helps in the prevention of cervical cancer	29(30.5)	48(50.5)	12(12.6)	6(6.3)
Screening causes no harm to the client	30(31.6)	37(38.9)	17(17.9)	11(11.6)

SA: Strongly Agree; A: Agree; NADA: Neither agree nor disagree; D: Disagree.

3.5. Overall Attitudes Scores and Age by Attitudes of Participants

The results of the overall attitude score show that slightly more than half (52.6% n=50) of the participants had a positive attitude towards cervical cancer and screening and almost half (47.4% n=45) had a negative attitude (Figure 3). Figure 4 shows Positive attitude was highest among the elderly (58-68 years) while negative was highest among the 47 years to 57 years age group (Figure 4). The differences in proportion of positive and negative attitude across the different age groups was statistically significant (p=0.48).

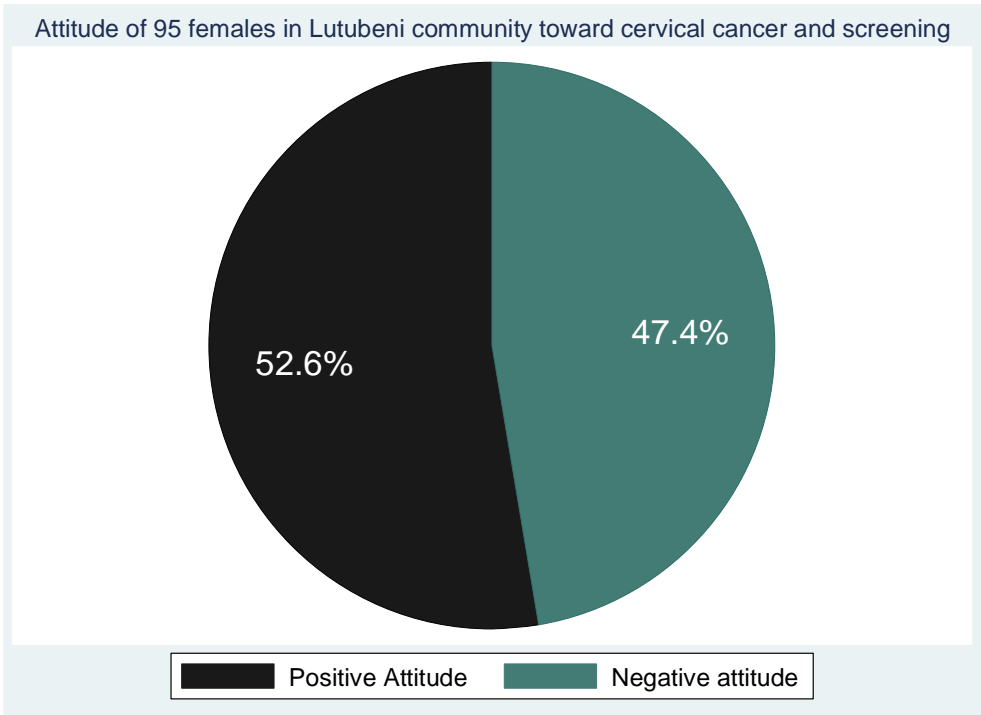


Figure 3. Attitude of the participants towards cervical cancer and screening.

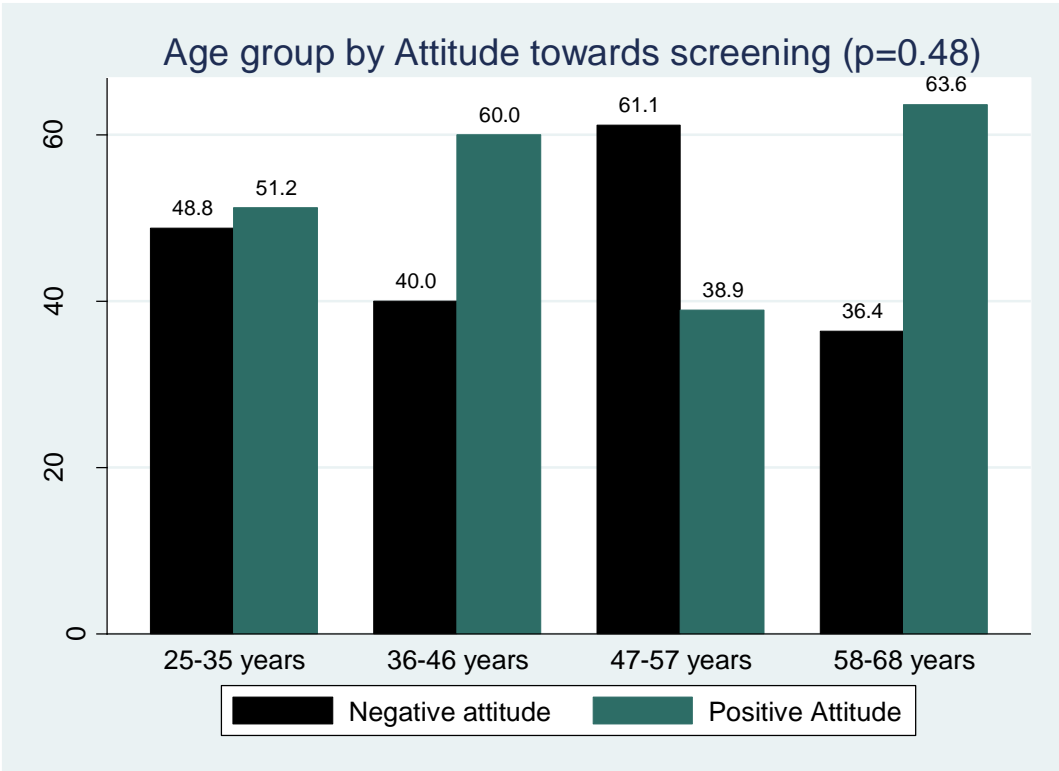


Figure 4. Age group by Attitude toward cervical cancer and screening.

3.6. Cultural Views Regarding Cervical Cancer Among Study Participants

Study participants with Cultural views regarding cervical cancer and cervical cancer screening that these aspects were false (Table 5).

Table 5. Cultural views regarding cervical cancer and cervical cancer screening.

Variable	True n (%)	False n (%)
Sexual Organs are not a topic for discussion	84 (88.4)	11 (11.6)
Diagnosis with Cervical Cancer is Associated with Death	28 (29.5)	67 (70.5)
Diagnosis with Cervical Cancer means you are having Multiple Sexual Partners	16 (16.8)	79 (83.2)
Diagnosis with Cervical Cancer means you are Promiscuous	18 (18.9)	77 (81.1)
Fear of Cervical Cancer	21 (22.1)	74 (77.9)
Cervical Cancer is Perceived to be caused by Indecent Behaviour	31 (32.6)	64 (67.4)
Need approval from Partner for Cervical Cancer Screening	11 (11.6)	84 (88.4)
Cultural Views around Cervical Cancer Screening influence my decision to screen	7 (7.4)	88 (92.6)
Traditional Medicines are the primary healthcare-seeking option	11 (11.6)	84 (88.4)
Views around Cervical Cancer Screening are the primary reason why I have never been screened for Cervical Cancer	4 (4.2)	91 (95.8)
One’s sexual organs are private and not supposed to be exposed or touched	87 91.6)	8 (8.4)

3.7. Cervical Screening Practice and Cervical Screening Experiences of the Participants

The majority (55.8%) had screened for cervical cancer and 42 (44.2%) had never screened for cervical cancer (Table 5). Those who had screened one time (43.2%) . A high proportion (33.7%) of them had been screened in the clinic and 39 (44.1%) were screened at the initiation of a health professional, (13.7%) were self-initiated and the rest (1.1%) was initiated by a friend. Eighty-eight (92.6% n=88) participants had screened for other reproductive issues such as HIV and STI. Based on screening experiences the 55.8 percent were labelled as having good screening practice and 44.2% as poor screening practice (Figure 5).

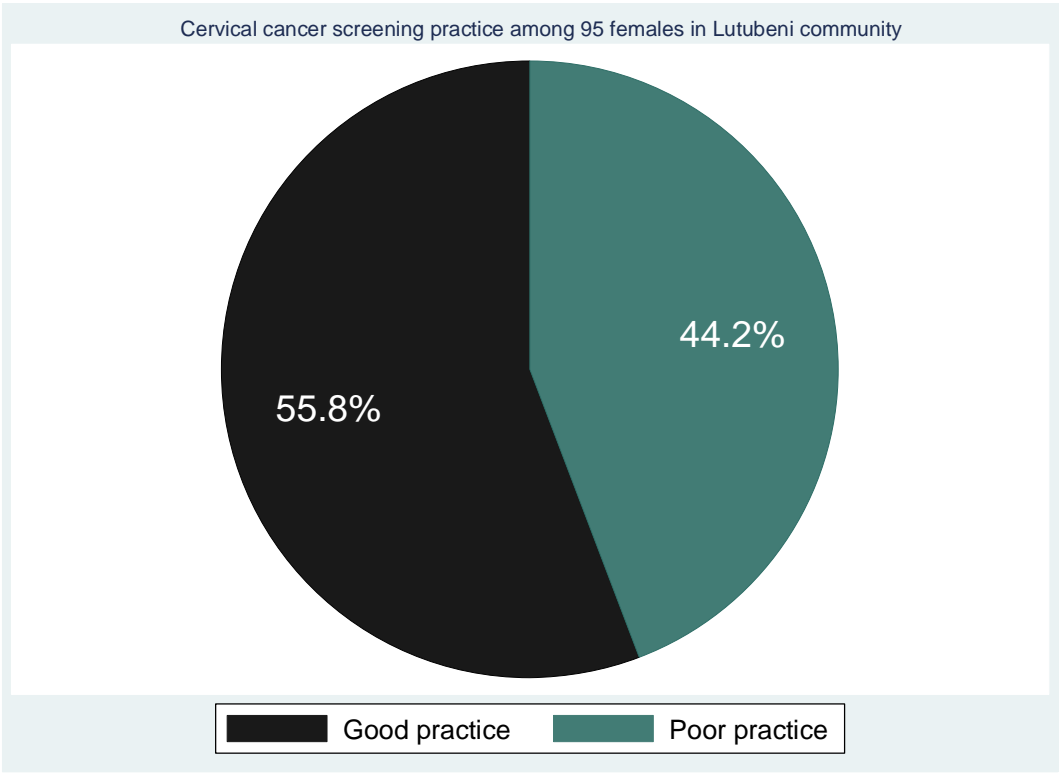


Figure 5. Cervical screening experiences of the participants.

Table 6. Cervical screening Practice of the participants.

Variable	Category	Frequency (n=95)	Percent (%)
Have you ever been screened for cervical cancer	Yes	53	55.8
	No	42	44.2
Where did you screen	Never screened	42	44.2
	Clinic	32	33.7
	Hospital	20	21.1
	Others	1	1.1
	Once	41	43.2
How many times did you screen	Twice	8	8.4
	Thrice	2	2.1
	Four times	1	1.1
	Five times	1	1.1
When was the last time you screened	Last year	28	29.4
	> 3 years	12	12.6
	Within the past 3 years	9	9.5
	<3 years	4	4.2

Who initiated you to be screened	Health professional	39	41.1
	Self-initiated	13	13.7
	Others	1	1.1
Have you ever made use of reproductive health services like HIV or STI testing	Yes	88	92.6
	No	7	7.4

3.7. Age group by Cervical Cancer Screening Practice

The proportion of participants who screened for cervical cancer across the different age groups (Figures 4–6) was not statistically significantly different ($p>0.05$), although good practice was highest among the middle age group (36-46 years) and poor practice among the elderly (58-68 years).

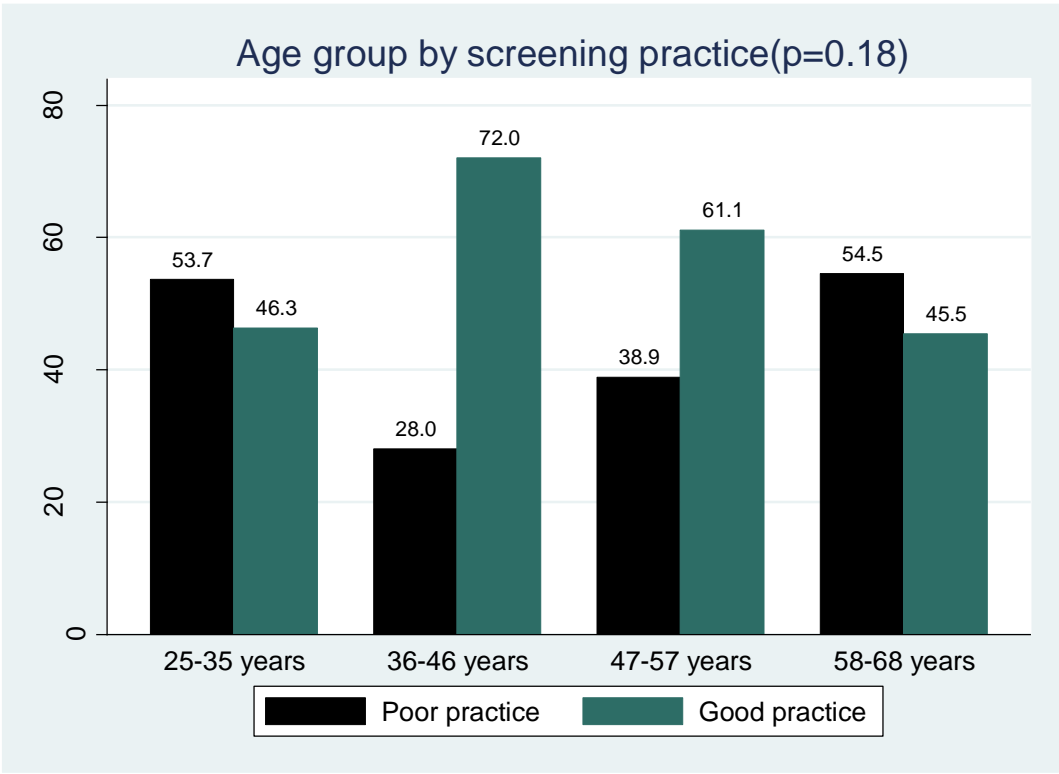


Figure 6. Age group by Cervical cancer screening practice.

3.8. Factors Associated with Practice Towards Cervical Cancer Screening

Bivariate analysis revealed that educational attainment, knowledge of cervical cancer symptoms, risk factors, prevention, treatment, screening availability, screening procedures, composite knowledge, and attitude towards screening were all significantly associated with cervical cancer screening practices (Table 7). Participants with a diploma or degree were significantly more likely to exhibit good screening practices (87.5%; $p = 0.047$). Good practice was also significantly associated with adequate knowledge of cervical cancer symptoms (69.6%; $p = 0.040$), risk factors (90.9%; $p < 0.0001$), treatment (91.7%; $p < 0.001$), screening procedures (100%; $p = 0.002$), and composite knowledge (100%; $p < 0.0001$).

Conversely, poor screening practice was significantly associated with poor knowledge of screening availability (100%; $p < 0.0001$) and negative attitudes towards cervical cancer screening (82.9%; $p < 0.0001$).

Table 7. Factors associated with practice towards cervical cancer screening.

Associate factors	Cervical cancer screening practice		X ² p-value
	Poor practice (N=42)	Good practice (N=53)	
Educational status			0.047*
Degree	1 (33.3)	2 (66.7)	
Diploma	3 (18.8)	13 (81.2)	
Diploma/Degree	1 (12.5)	7 (87.5)	
No formal education	7 (58.3)	5 (41.7)	
Primary school	9 (56.2)	7 (43.8)	
Secondary	21 (52.5)	19 (47.5)	
Knowledge of symptoms of cervical cancer			0.04
Good	7 (30.4)	16 (69.6)	
Moderate	9 (33.3)	18 (66.7)	
Poor	26 (57.8)	19 (42.2)	
Knowledge related to the risk factor of Cervical cancer			<0.0001*
Good	1 (9.1)	10 (90.9)	
Moderate	5 (19.2)	21 (80.8)	
Poor	36 (62.1)	22 (37.9)	
Knowledge related to prevention			<0.0001*
Good	4 (10.3)	35 (89.7)	
Moderate	2 (50.0)	2 (50.0)	
Poor	36 (69.2)	16 (30.8)	
Knowledge related to the treatment of cervical cancer			0.001
Good	1 (8.3)	11 (91.7)	
Moderate	14 (34.1)	27 (65.9)	
Poor	27 (64.3)	15 (35.7)	
Knowledge of screening availability			<0.0001*
Good	31 (37.3)	52 (62.7)	
Moderate	3 (75.0)	1 (25.0)	
Poor	8 (100.0)	0 (0.0)	
Knowledge related to Cervical screening procedure			0.002*
Good	0 (0.0)	1 (100.0)	
Moderate	32 (38.6)	51 (61.4)	
Poor	10 (90.9)	1 (9.1)	
Composite Knowledge			<0.0001*
Good	0 (0.0)	3 (100.0)	
Moderate	11 (22.9)	37 (77.1)	
Poor	31 (70.5)	13 (29.5)	
Attitude towards cervical cancer and screening			<0.0001
Negative attitude	29 (82.9)	6 (17.1)	
Positive Attitude	13 (21.7)	47 (78.3)	

3.9. Independent Factors Associated with Poor Practice

The multinomial logistic regression analysis identified three independent predictors of poor cervical cancer screening practice: having a diploma, good knowledge of prevention, and a negative attitude towards screening (Table 8). Surprisingly, participants with a diploma or good preventive knowledge were less likely to undergo screening. Notably, participants with a negative attitude were significantly more likely to forgo screening (OR = 36.22; $p = 0.005$).

Table 8. Independent factors associated with poor practice.

Independent factors of poor practice		B	p-value	OR (95% CI)
Poor screening practice Versus good screening practice	Held a Diploma	-3.278	0.042	0.04 (0.002-0.894)
	Good knowledge related to Prevention	-3.905	0.012	0.02 (0.001-0.424)
	Negative attitude towards cervical cancer and screening	3.590	0.005	36.22 (2.9-453.6)
Model: X ² = 85.3; Nagelkerke R ² =79.3%; p<0.0001. B=Regression coefficient, OR = Odd Ratio				

4. Discussion

This study explored the knowledge, attitudes, cultural beliefs, and cervical cancer screening practices among women in a rural South African setting, revealing a complex interplay of awareness, education, cultural norms, and behavioral factors influencing screening uptake. Despite relatively high awareness (87.4%) about cervical cancer and its screening services, only slightly more than half (55.8%) of participants had ever undergone screening. These findings are consistent with studies conducted in similar settings, where awareness does not necessarily translate into action, largely due to cultural and psychosocial barriers [20–22]. The knowledge assessment revealed that only 3.2% of respondents demonstrated good composite knowledge of cervical cancer, aligning with other research from sub-Saharan Africa that underscores persistent knowledge gaps despite public health campaigns [16,23,24]. While symptoms like vaginal bleeding and foul-smelling discharges were widely recognized, deeper understanding of risk factors particularly HPV infection was limited. This may reflect deficiencies in community targeted educational strategies and the lack of integration between HPV vaccination programs and cervical cancer awareness [25–28]. Our study further established that cultural beliefs particularly the taboo surrounding discussions about sexual and reproductive health remained pervasive, with 88.4% of participants agreeing that sexual organs are not topics for open conversation. These sociocultural constraints reflect broader findings from Zimbabwe and Namibia, where patriarchal norms, stigma, and misinformation hinder access to preventive services [29–32]. The role of education in influencing screening behavior was notable. Women with diploma or higher qualifications were more likely to have undergone screening. However, paradoxically, multinomial logistic regression revealed that holding a diploma was an independent predictor of poor screening practice. This may be due to the small sample size of diploma holders and potential confounding factors such as employment type or health service accessibility. Attitudes toward screening were strongly predictive of behavior. Participants with negative attitudes were over 36 times more likely to forgo screening (OR = 36.22; p = 0.005). This finding aligns with recent studies emphasizing that perception and trust in healthcare systems, fear of pain or diagnosis, and fatalistic beliefs significantly deter women from utilizing preventive services [33–35]. Despite the availability of free cervical screening services in South Africa, structural and behavioral barriers persist. Poor knowledge of screening intervals and eligibility criteria further contributes to inconsistent or delayed uptake. Notably, the WHO’s 90-70-90 strategy for cervical cancer elimination by 2030 emphasizes the need for 70% of women to be screened by age 35 and again by 45; however, achieving these targets will be difficult without concerted community-based health education and structural reforms [36–39].

4.1. Limitations

This study is not without limitations. First, the use of a convenience sampling method limits the generalizability of the findings to other rural settings. Second, the reliance on self-reported data may introduce recall and social desirability biases, especially in sensitive topics such as sexual history and health service utilization. Third, the cross-sectional design precludes causal inferences. Lastly, the

small sample size and the limited representation of certain educational and age subgroups may affect the robustness of multivariate associations.

4.2. Future Research

Future studies should adopt a longitudinal design to assess changes in knowledge and behavior over time and examine the impact of targeted interventions. Qualitative studies exploring personal, familial, and community-level barriers would offer richer insights into the socio-cultural dynamics affecting screening uptake. Furthermore, investigations into the role of male partners and community leaders in influencing women's health-seeking behaviors could inform more inclusive and culturally sensitive educational strategies. Lastly, evaluating the effectiveness of mobile health interventions (e.g., SMS reminders or telehealth education) in rural settings could offer scalable solutions to address barriers identified in this study.

5. Conclusion

Although awareness of cervical cancer screening was relatively high among women in the Lutubeni community, overall knowledge remained poor, and nearly half of the participants had never undergone screening. Cultural taboos, negative attitudes, and gaps in knowledge continue to hinder optimal utilization of screening services. These findings underscore the urgent need for comprehensive, culturally appropriate health education programs that go beyond awareness to address deep-seated beliefs, misinformation, and attitudinal barriers. Improving cervical cancer screening rates in rural South Africa will require a multifaceted approach that incorporates education, community engagement, and healthcare system strengthening in alignment with global cervical cancer elimination goals.

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Abbreviations

The following abbreviations are used in this manuscript:

SSA	Sub Saharan Africa
OR	Odd Ratio
COBES	Community-Based Education and Service
LMIC	Low- Middle Income Country

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