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Poor knowledge and awareness of human papillomavirus and cervical cancer among adult females in rural Ghana

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Cervical cancer (CC) continues to be a global burden, and a disease of public health interest, especially in low- and middle-income countries. This study explored the knowledge and awareness of human papillomavirus (HPV) infection and CC and the risk-behavioural characteristics of an adult female population in rural Ghana. A total of 274 women, aged 21 years and above were recruited through multi-stage sampling. A questionnaire was used to obtain data on their socio-demographic and socio-economic characteristics and assess their knowledge and awareness of HPV and CC through face-to-face interviews. In all, 187 (68.2%) participants had poor knowledge of HPV and CC with 87 (31.8%) having good knowledge. Only 18.2% and 48.9% of them had prior awareness of HPV infection and CC, respectively. Their primary source of information was the broadcast media (TV and Radio stations) (60.1%). Regarding risky lifestyle behaviours, the mean age at sexual debut was 18.52 ± 2.39 years, 82.8% have had more than one lifetime sexual partner, 81.0% were multiparous with 51.5% using oral contraceptives. Women with higher educational attainment (cOR = 0.41; 95%CI = 0.20-0.81), monthly income (cOR = 0.31; 95%CI = 0.10-1.02), and lifetime sexual partners (aOR = 0.46; 95% CI = 0.21-1.00) were less likely to have poor CC and HPV knowledge compared to their counterparts. In conclusion, adult females in the rural population have limited knowledge and awareness of HPV infection and CC with low CC screening. Intensive educational campaigns should be organised and spearheaded on multiple platforms by the Ghana Health Service and civil societies to sensitise and educate women, in the rural parts of the country, on CC and its related preventive measures.

KEYWORDS

cervical cancer, human papillomavirus (HPV), rural, knowledge, awareness, infection

Introduction

Cervical cancer (CC) continues to be of public health concern in Ghana, just like in most developing countries (1–4). Globally, it is rated among the top five most common cancers diagnosed among females, with a significant mortality rate (5, 6). CC is the fourth most common disease in women and the fourth greatest cause of cancer mortality, with a reported 604,000 new cases and 342,000 deaths globally in 2020 (7). In Ghana, CC continues to be the most predominant cancer diagnosed, with a mortality rate three times higher than the global rate (1, 2, 6, 8, 9). CC in Ghana has a high age-standardized incidence and death rate of 32.9 and 23.0 per 100,000 respectively (10).

Over 90% of CC cases are generally implicated with the acquisition and persistence of Human Papillomavirus (HPV) infection, more typically, the oncogenic types (11–13). As the most common sexually transmitted infection, it is considered that the risk of sexually active persons, especially women, getting infected with HPV within their lifetime is nearly 80% (11, 12, 14). However, other factors, coupled with HPV acquisition and persistence, increase the risk of developing precursor lesions and ultimately, CC. Agreeably, these factors can be broadly classified as; (1) those that increase the risk of acquiring infection and its persistence, such as multiple lifetime sexual partners, early age of sexual debut, co-infections and immune-related diseases; (2) those that increase the risk of carcinogenesis in the face of persistent HPV infection, such as smoking, multiparity, prolonged hormonal contraceptive usage and heavy alcohol consumption, and (3) those that combine both effects (15).

In Ghana, most patients with CC present with their condition to health facilities at advanced stages. This, ultimately, accounts for the high mortality rate in the country (1, 5). Several studies in Ghana (6, 16, 17) and other countries (18–22) have indicated low awareness and knowledge of CC and HPV infection to be major factors influencing the uptake of screening programmes.

To attain target 3.4 of the UN Sustainable Development Goal (SDG), the WHO projection of a 90-70-90 target by 2030 has been expanded to help with the ultimate goal of global elimination of CC (23, 24). Target 3.4 of the SDG aims to reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. The WHO triple-intervention strategy aims to achieve 90% vaccination of all girls by age 15 years, 70% screening coverage of women twice between 35 to 45 years, and at least 90% treatment of all precancerous lesions detected (25, 26). To achieve this, public awareness of CC and HPV infection is recommended to enhance the development of appropriate attitudes toward CC prevention, diagnosis, and management (1, 17). However, since its discovery in the 4th century, knowledge and awareness of CC and its relationship with HPV infection, continue to stagnate, especially

among rural populations (16, 27). The need to create public awareness, especially among the rural population is likely to enhance the development of a positive attitude towards the prevention, diagnosis and management of CC and ultimately attain the WHO 2030 triple projection strategy (28–30).

The impact of health education on CC knowledge and screening has earlier been reported (30). However, the level of CC and HPV knowledge among women in rural communities in Ghana has not been adequately explored. For instance, to the best of our knowledge of CC has not been assessed at the Akyemansa District. The objectives of this study were therefore to (1) assess the knowledge and awareness of HPV infection and CC among adult females, (2) determine the factors associated with knowledge and awareness of HPV infection and CC and (3) determine the risk-behavioural characteristics regarding HPV infection and CC among adult females in rural communities in the Akyemansa District of Ghana. The findings of this study would be important for implementation of interventions to increase cervical cancer awareness, screening and vaccination at the Akyemansa District and other rural communities.

Materials and methods

Study design and subjects

This cross-sectional study was conducted in five conveniently selected rural communities in the Akyemansa District of the Eastern Region of Ghana, from 1st May to 30th June 2019.

Study site and population

The Akyemansa District of the Eastern region of Ghana is a predominantly rural setting, which is endowed with several natural resources, including gold and diamond deposits. The population of women in the district was estimated as 49,371 representing 50.7% of the total population of the district based on the 2010 population and housing census (31). The prevalence of the human immunodeficiency virus (HIV) among adults in the district was 0.57% (32).

Sample size and sampling

The minimum sample size of 381 required for the study was determined using the StatCalc function of Epi Info software, Version 7.2.5.0 (Centre for Diseases Control, Atlanta, Georgia, USA, and World Health Organization, Geneva, Switzerland). The following assumptions were made: population size of women in the

Akyemansa District of 49,371, a confidence level of 95%, expected proportion or knowledge prevalence of 50%, error margin of 5%, and design effect of 1.0. However, some participants invited were unwilling to participate because of the sensitive nature of some of the study questions therefore a total sample size of 274 was realised at the end of the study. Participants were required to be women who were (i) Ghanaians and residents of the district, (ii) 18 years and above, (iii) could express themselves in Twi or English languages and (iv) willing to participate in the study.

A multi-stage sampling procedure was used to recruit the study participants. First, study communities were conveniently selected. Second, the probability proportionate to size approach was employed in selecting the households within each community. To select the study participants within the households in each community, house-to-house visits were employed. One female member of the selected households who met the inclusion criteria was selected upon consent to be interviewed.

Study instrument and data collection

A close-ended questionnaire, adopted from previous studies (33–35), with open-ended options to allow for additional information, was used to obtain information from the participants. The questionnaire consisted of twenty-one items and was administered by three trained female assistants, who could also translate the content of the questionnaire into the local languages through face-to-face interviews. The assistants had a two-day training on data gathering processes, community entry, and communication skills.

The questionnaire assessed sociodemographic information. Age was collected as a continuous data and categorised (21–30 years, 31–40 years, 41–50 years or 51 years or more). Participants' gender (male or female), marital status (single, married, cohabiting, divorced, or widowed), and educational attainment (primary school, junior high school, senior high school, tertiary, or no formal education) were collected as categorical data. Open-ended questions were used to solicit information concerning participants' religion and occupation. Respondents were also made to indicate their average monthly income (100–500, 600–1000, 1100–1500 or 1500 and more) in Ghana cedis.

Participants' knowledge of HPV and CC was assessed using six items that assessed whether participants (i) have heard of HPV infection, (ii) have heard of cervical cancer, (iii) have ever been screened for HPV, (iv) could identify the screening tools for HPV, (v) knows HPV could be contracted through sexual contact and (vi) are aware of the availability of HPV vaccines. For each item, the participants were asked to choose one of the three options: “Yes,” “No,” or “Don't know”. For the question (iv), participants were to choose between, “Pap smear”, “VIA” or “Don't know”. A composite knowledge score was obtained by assigning a score of 1 to any positive response to the six (6) questions on knowledge of HPV infection, CC, and screening. A negative response was assigned a

score of 0; thus, the score range was 0–6. Using their respective knowledge scores and a cut-off point based on the median score, the participants were categorised as having ‘poor’ or ‘good’ knowledge of HPV and CC.

The questionnaire finally assessed risky behavioural characteristics that are likely to expose respondents to CC. Information on participants' frequency of alcohol intake, contraceptive use, and smoking habit were collected. Participants' age at first sexual intercourse, number of lifetime sexual partners and parity were collected as continuous variables. These variables were categorised: age at first sexual intercourse (<18 years and ≥18 years), lifetime sexual partners (<2 and ≥2) and parity (≤2 and >2).

Questionnaire validity and reliability were carried out before the commencement of the study by pretesting twenty adult females in Amamoma, a small community near the North Campus of the University of Cape Coast. The analysis showed that the questionnaire had good internal consistency with a Kuder-Richardson Reliability coefficient of 0.738. Again, we observed that some participants misconstrued HPV for HIV and so in the final study, we had to let participants know the two are different.

Data analysis

Data obtained was entered into Microsoft Excel (2016) and transferred into STATA Software version 14 (STATA Corp, Texas USA) for statistical analysis. Descriptive statistics such as frequencies, percentages, and means were used to summarize the background characteristics of participants.

A bivariate analysis using Pearson's Chi-square, Fisher's Exact tests, and a one-way analysis of variance was used to examine differences in knowledge of HPV and cervical cancer based on participants' characteristics. Variables with P -value ≤ 0.25 in the bivariate analysis were included in a binary logistic regression analysis to identify possible determinants of knowledge of HPV and CC. The results of the regression analysis are reported as odd ratios (OR) with 95% confidence intervals (CI). A P -value less than 0.05 was considered statistically significant in all analyses.

Results

Socio-demographic and socio-economic characteristics of participants

Characteristics of the participants are detailed in [Table 1](#). Of 381 participants required and invited to participate in the study, 274 females, representing a 72% response rate, participated in the study. The mean (SD) age of participants was 39.65 (13.63) years. The youngest was 21 years while the oldest was 80 years old. Most of the participants (91/274, 33.2%) were between 21 to 30 years of age. A little over half of them (168/274, 61.3%) had partners (married or cohabiting) and almost all (99.3%) were

TABLE 1 Participants' characteristics, N = 274.

Variable	Categories	Frequency	Percent	Mean (SD)
Demographic information				
Age (years)	21-30	91	33.2	39.65 (13.63)
	31-40	59	21.5	
	41-50	61	22.3	
	>50	63	23	
Marital status	Single	52	19.0	
	Married	140	51.1	
	Cohabiting	28	10.2	
	Divorced	36	13.1	
	Widowed	18	6.6	
Religion	Christian	272	99.3	
	Muslim	2	0.7	
Educational attainment	No formal education	37	13.5	
	Primary school	59	21.5	
	Junior high school	140	51.1	
	Senior high school	20	7.3	
	Tertiary	18	6.6	
Occupation	Housewife	6	2.2	
	Student	12	4.4	
	Retired	8	2.9	
	Civil servant	20	7.3	
	Trading	110	40.2	
	Farming	73	26.6	
	Craftmanship	45	16.4	
Monthly income (GHC)	<600	240	87.6	
	600-1000	22	8	
	1100-1500	10	3.6	
	>1500	2	0.7	
HPV and cervical cancer risk factors				
Age at first sex (years)	< 18	83	30.3	18.52 (2.39)
	≥ 18	191	69.7	
Lifetime sexual partners	1	47	17.2	2.52 (1.00)
	2	86	31.4	
	3	94	34.3	
	4	46	16.8	
	5	1	0.4	
Parity	0	16	5.8	3.94 (2.60)
	1	36	13.1	
	2 - 4	122	44.5	
	>4	100	36.5	
Smoking behaviour	Never smoked	273	99.6	
	Ever smoked	1	0.4	
Alcohol consumption	Never	195	71.2	
	Occasionally	59	21.5	
	Frequently	20	7.3	
Contraceptive use	Never taken	133	48.5	
	Ever taken	141	51.5	

Christians. The highest educational attainment for majority of the participants (140/274, 51.1%) was junior high school (JHS), with majority being involved in trading (110/274, 40.1%). More than 80% of the participants (240/274, 87.6%) earned an average monthly income of GhC600.00 (US\$ 60.0) or lower.

Regarding the risk behaviours of the participants that may predispose them to the acquisition of HPV and the development of CC, more than half of them had their sexual debut after 18 years of age (191/274, 69.7%). Similarly, majority of participants have had more than one lifetime sexual partners (227/274, 82.8%), been taking hormonal contraceptives (141/274, 51.5%), and have had 2-4 pregnancies (122/274, 44.5%).

Knowledge and awareness of cervical cancer and HPV infection

With regards to knowledge and awareness of CC and HPV infection (Table 2), only 134 (48.9%) and 50 (18.2%) of the participants had previously heard of CC and HPV infection, respectively. Only 9 (3.3%) of the participants were aware of either the conventional Pap smear test and/or Visual Inspection with Acetic acid (VIA) being the common screening tools in Ghana, and only 3 (1.1%) had ever been screened in the past 5 years. In addition, only 56

(20.4%) and 30 (10.9%) knew that HPV infection is sexually transmitted and that vaccines are available for HPV, respectively.

The median (interquartile range [IQR]) knowledge score of respondents was 1.0 (2) out of a maximum score of 6.0: 47.8% (n = 131) provided no positive response, whereas only 0.4% (n = 1) provided positive responses to all 6 questions. Among the participants who provided any positive response, the majority (n=58, 21.2%) answered so with only 2 questions. Overall, only 87 (31.8%) had good knowledge with 187 (68.2%) demonstrating a poor knowledge score. When asked to provide their sources of information about HPV and CC, the primary sources of information cited by most of the participants were the broadcast media (64.1%) and education by community health workers and facilities (33.1%) (Figure 1).

Correlates of knowledge and awareness of cervical cancer and HPV infection among women in the Akyemansa District

The factors which were significantly associated with knowledge and awareness of HPV infection and CC were educational attainment ($\chi^2 = 6.780$, $p = 0.009$) and monthly income ($\chi^2 = 4.092$, $p = 0.048$) based on bivariate analysis (Table 3). Women with

TABLE 2 Participants' knowledge of HPV and cervical cancer, N = 274.

Survey item	Frequency	Per cent
1. Ever heard of cervical cancer?		
No	140	51.1
Yes	134	48.9
2. Ever heard of HPV infection as a precursor of cervical cancer?		
No	224	81.8
Yes	50	18.2
3. Known cervical cancer screening tools in Ghana		
None	265	96.7
Pap smear/VIA/both	9	3.3
4. Ever screened for cervical cancer in the past 5 years?		
No	271	98.9
Yes	3	1.1
5. Ever knew HPV infection as an STI?		
No/not sure/do not know	218	79.6
Yes	56	20.4
6. Ever Knew of the availability of HPV vaccines?		
No	244	89.1
Yes	30	10.9
Summary statistics		
Minimum = 0		
Maximum = 6		
Median (IQR) = 1.0 (2)		
Good knowledge = 87 (31.8%)		
Poor knowledge = 187 (68.2%)		

a higher educational attainment (Senior high school and above) were less likely to have poor knowledge of HPV and CC than those with lower education (Junior high school and lower). Likewise, women with higher monthly income (> GHC1,000) were less likely to have poor knowledge of HPV and CC than those with lesser monthly income (\leq GHC1,000).

Multivariate analysis showed that women with higher educational attainment (cOR = 0.41; 95%CI = 0.20-0.81), monthly income (cOR = 0.31; 95%CI = 0.10-1.02), and lifetime sexual partners (aOR = 0.46; 95%CI = 0.21-1.00), are less likely to have poor CC and HPV knowledge compared to their counterparts (Table 4).

Discussion

The need to create public awareness, especially among rural populations, is likely to enhance the development of a positive

attitude towards the prevention, diagnosis and management of CC and ultimately attain the WHO 2030 triple projection strategy. This study highlights a gap in CC and HPV knowledge and awareness among rural women in the Akyemansa District of Ghana. The broadcast media (TV and radio stations) and health workers are reported to be the main source of information on CC and HPV. The major factors associated with a good knowledge and awareness were higher education, higher income and surprisingly having higher lifetime sexual partners. The study also reports a relatively high involvement in risky lifestyles which are likely to expose women in the selected communities to CC and HPV infection.

The WHO recommends that CC screening should begin at the age of 30 years, for the general population and 25 years, for women living with HIV. Subsequently, regular screening should be performed every 3-5 years, depending on the screening method used (23, 24, 36). In this study, the mean age of the participants (39.7 ± 13.6 years) shows that most of the women

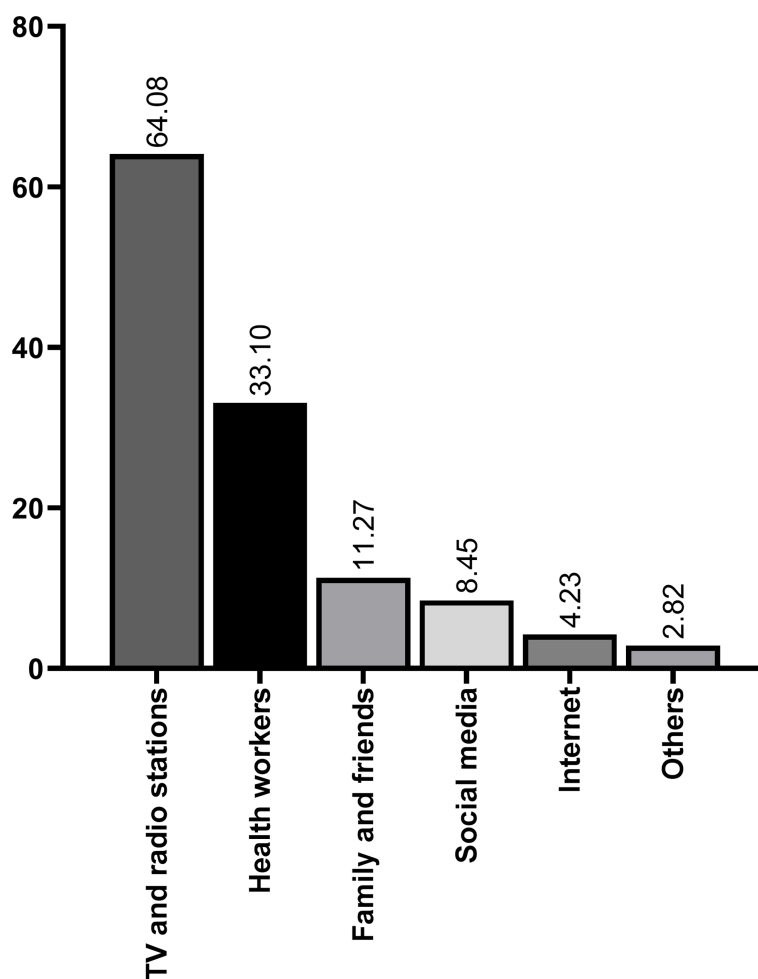


FIGURE 1
Participants' sources of information about HPV and cervical cancer.

TABLE 3 Bivariate associations between demographic variables and outcome variables, N = 274.

Variable	No. (%) with poor knowledge of HPV and CC, n = 187	No. (%) with good knowledge of HPV and CC, n = 87	Chi-square	p-value
Demographic characteristics				
Age Category				
≤ 30 years	61 (32.6)	30 (34.5)	0.093	0.784 ^b
> 30 years	126 (67.4)	57 (65.5)		
Marital status				
Single	34 (18.2)	18 (20.7)	0.602	0.740 ^b
Married/cohabiting	114 (61.0)	54 (62.1)		
Divorced/widowed	39 (20.9)	15 (17.2)		
Educational attainment				
Low education (JHS or lower)	168 (89.8)	68 (78.2)	6.780	0.009^b
High education (SHS or more)	19 (10.2)	19 (21.8)		
Employment				
Not working	20 (10.7)	6 (6.9)	0.998	0.381 ^b
Working	167 (89.3)	81 (93.1)		
Monthly income				
≤ GHC1,000	182 (97.3)	80 (92.0)	4.092	0.048^a
> GHC1,000	5 (2.7%)	7 (8.0)		
Risk factors for HPV infection and CC				
Age at first sex				
Less than 18 years	59 (31.60)	24 (27.6)	0.442	0.573 ^b
18 years and above	128 (68.4)	63 (72.4)		
Lifetime sexual partners				
< 2	37 (19.8)	10 (11.5)	2.873	0.121 ^b
≥ 2	150 (80.2)	77 (88.5)		
Parity				
≤ 2	56 (29.9)	33 (37.9)	1.726	0.213 ^b
> 2	131 (70.1)	54 (62.1)		
Alcohol consumption				
Never drank	137 (73.3)	58 (66.7)	1.259	0.316 ^b
Ever drank	50 (26.7)	29 (33.3)		
Contraceptive use				
Never taken	91 (48.7)	42 (48.3)	0.004	1.000 ^b
Ever taken	96 (51.3)	45 (51.7)		

The level of significance was established with a p-value < 0.05. The Fisher's Exact tests (a) and Chi-square (b) were used to establish the significance of the association between variables. Bold numbers under p-value column indicates, statistically significant p-values (p < 0.05).

(64.6%, n=177) were within the recommended age range for CC screening which is stipulated at 25–65 years of age (37). Given this, it was expected that most of the participants would have had at least one CC screening at the time of the study. Also, similar to earlier studies, this study found most of the participants to be 21–30 years (90, 32.8%) (22, 38, 39). This signifies that over 30% of the participants should have had their initial CC screening at the time of the study.

In general, majority of the study population (68.2%, n=187) demonstrated poor knowledge of CC and HPV infection with over 70% of participants provided no positive response to any of the survey questions. The proportions of participants who were

aware of HPV infection and CC were 18.2% (50/274) and 48.9% (134/274) respectively. Earlier studies at Elmina, a town along the coastal belt of Ghana, South Africa and Northeast China (16, 21, 40, 41) reported similarly reduced awareness of HPV and CC. On the contrary, previous studies in Southwest China, Ethiopia, North Korea, Qatar and Nigeria reported greater proportions of awareness of CC and HPV infection among the studied populations (3, 42–45). The differences in awareness could be explained by differences in the study population as the earlier studies involved participants from peri-urban and urban communities where adequate information on the disease may be available.

TABLE 4 Factors independently associated with poor knowledge of HPV and CC based on univariate and multivariate analysis.

Variable	cOR (95% CI)	p-value	aOR (95% CI)	p-value
Educational attainment				
Low education (JHS or lower)	1 (reference)		1 (reference)	
High education (SHS or more)	0.41 (0.20-0.81)	0.011	0.45 (0.20-1.00)	0.041
Monthly income				
≤ GHC1,000	1 (reference)		1 (reference)	
> GHC1,000	0.31 (0.10-1.02)	0.044	0.53 (0.15-1.87)	0.321
Lifetime sexual partners				
< 2	1 (reference)		1 (reference)	
≥ 2	0.53 (0.25-1.12)	0.094	0.46 (0.21-1.00)	0.049
Parity				
≤ 2	1 (reference)		1 (reference)	
> 2	1.43 (0.84-2.44)	0.190	1.22 (0.68-2.21)	0.505

cOR – crude odds ratio; aOR – adjusted odds ratio; 95% CI – 95% confidence interval. Bold numbers under p-value column indicates, statistically significant p-values ($p < 0.05$).

In this study, poor knowledge of HPV infection and CC was significantly associated with lower education, and lower income. A study in Ethiopia similarly identified 80% of the study population to have poor knowledge of CC and HPV infection (3) and this observation was associated with the socio-economic characteristics of the studied population. Lower education has, in several studies, been attributed to a poor knowledge of CC and HPV in the continent (46–48). This is an issue of concern requiring attention. It has been reported in China that women who are well educated are more willing to undergo CC screening (49). Just as reported in Ghana (30) and other African countries (48, 50, 51), an increased health literacy could have a significant effect on CC awareness and screening. The association of income with CC and HPV knowledge corroborates earlier reports from Kenya and Botswana (46, 52). Poor knowledge of CC and HPV among women with low income could be explained by inability to assess healthcare and the media which are the main sources of health information in the communities.

The study highlights some specific gaps in knowledge and awareness for consideration. For instance, with regards to knowledge of the common screening methods for cervical cancer used in Ghana, only 9 (3.3%) of the participants knew of the Pap test and Visual Inspection with Acetic Acid (VIA). This finding contradicted those of Heena et al. (33) and Owoeye and Ibrahim (45) who reported over 50% awareness of cervical cancer screening methods in Saudi Arabia and Nigeria, respectively. The later studies involved a population of health workers in an urban area in Saudi Arabia (33) and students and staff of a tertiary institution in an urban area in Nigeria (45). This suggests that peer-led enhanced health education in schools, working areas and the community at large helps create adequate awareness among populations in different geographical locations (30, 53, 54).

In the preceding 5 years, only 3 (1.09%) of the participants have had cervical cancer screening. This finding could be attributed to

the absence of screening centres in the communities and difficulty in accessing those outside the communities because of distance and limited financial resources to cater for the cost of screening and management. In Ghana, there are a few public and private healthcare facilities that actively provide CC screening services and these are done at a cost to patients because this service is not covered by the National Health Insurance Scheme (1). Low patronage of the screening services among women in Ghana has been attributed to low financial resources, low education, lack of national CC screening programmes and low levels of satisfaction and involvement in the health system (6). Contrary to our study, a relatively increased rate of screening was reported in Gabon and Nigeria (22, 55) and this was attributed to recommendations by physicians. To improve the patronage of CC screening among women, there should be the provision of adequate infrastructure and resources, trained health personnel, the inclusion of CC screening on the NHIS, provision of adequate education and well-laid policies on regular CC screening nationwide, especially in the rural communities (17, 41, 56).

In our study, the primary sources of knowledge of CC and HPV were the broadcasting media (TV and radio stations), health workers, family and friends, social media, the internet and others such as schools and churches. This finding was similar to that of an earlier study in Uganda (57) and it could be due to the similarity in the mode of dissemination of information in our areas of study. Integration of related health awareness themes into television and radio programmes, especially in the local dialects, may widely contribute to the awareness of CC in rural communities. It has been reported that talks at organised places and platforms improve the awareness of the infection and disease (58, 59); however, an increased screening rate could be achieved with the broadcasting of educational movies related to the disease (59).

Concerning lifestyles which may predispose participants to infection, we observed that, the mean age of the women at sexual

debut was 18.5 ± 2.39 years with almost one-third having their sexual debut before 18 years. This finding was similar to that of other studies in Ghana and Nigeria (60, 61). Again, over 60% of the participants (180/274, 65.7%) have had either two or three-lifetime sexual partners. Sexual intercourse is important for HPV transmission (62, 63). HPV infection and its persistence have been linked with an early age of sexual debut and multiple sexual partners (64–67). It was observed that having a higher number of lifetime sexual partners was associated with a good knowledge of CC. It is possible that these women have experienced CC or HPV symptoms and had sought for medical attention in the past. It has earlier been reported in Tanzania that women with increased number of lifetime sexual partners are more likely to take CC screening services (68). We also observed increased use of hormonal contraceptives among participants, as well as multiparity among a larger portion of the studied population. Contraceptive utilisation and parity have earlier been linked with HPV and CC (66, 67, 69). Educational campaigns should focus on educating women on how these risky behaviours puts them at risk of having CC.

Strengths and limitations of the study

This study is the first to highlight a gap in knowledge of CC and HPV with consequently reduced screening among rural populations in the Akyemansa District of Ghana. However, the study is not without limitations and therefore the findings should be interpreted considering these limitations. First, the sampling technique was likely to introduce some level of sampling bias. Some communities were not selected because of the convenient nature in which communities were selected for the study. The findings of this study may not represent that of communities which were not included in the study. Secondly, the small sample size limits the representativeness, generalizability and validity of the findings. Prospective follow-up research with a larger sample size would be more useful in determining the level of knowledge of HPV and cervical cancer in the district. By interviewing participants, social desirability bias is possible, particularly in answering questions on sexual history, use of contraceptives, alcohol intake and smoking history. Because of the sensitive nature of some of the questions it is possible that some information provided was under or over reported due to personal reasons.

Conclusion

We report that adult women in the rural parts of the Eastern Region of Ghana have limited knowledge and awareness of HPV infection and cervical cancer, as well as the screening and preventive tools available. Consequently, most of the women have certain lifestyle behaviours that predispose them to the risk of acquiring HPV infection and the subsequent development of cervical cancer. It is recommended that extensive educational campaigns on cervical

cancer and its prevention be organised to increase knowledge and awareness in the rural communities of the country. Finally, the government should adopt and implement policies that would ensure increased patronage and availability of cervical cancer screening services in the area.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Institutional Review Board, University of Cape Coast (UCCIRB/CHAS/2019/30). The patients/participants provided their written informed consent to participate in this study.

Author contributions

SE-B, LM, SK-A and SE developed the concept and design of the study. LM, BA-F and EA engaged in participants' recruitment, and data collection. LM and ME engaged in data entry and analysis, and initial manuscript writing. SE-B, ME, SK-A and SE were involved with the review of data and interpretation of research findings, and review of the manuscript. All authors reviewed the manuscript and accepted the final version for submission.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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