

Cervical Cancer at Mbarara Regional Referral Hospital: Magnitude, Trends, Stages at Presentation, Impact of Acetic Acid Screening and the Need for Radiotherapy Services

Mayanja Ronald;MD^{1*}, Chakura Andrew;MD¹, Masembe Sezalio;MD¹, Kasujja John;MD⁴, Aheisibwe Hillary;MD², Musa Kayondo;MD¹, Kanyesigye Hamson;MD¹, Wasswa Ssalongo;MD¹, Peter Mukasa;MD³, Prof Caesar Emilio Sanchez;MD¹, Joseph Ngonzi; MD

¹Department of obstetrics and Gynecology, Mbarara University of Science and Technology, Uganda

²Kabale Regional Referral Hospital, ³Ministry of Health Uganda, ⁴Department of Anesthesia, Mbarara University

* Corresponding author: kumarona@yahoo.com

Abstract

Background: Globally, cervical cancer the fourth most common cause of cancer death accountable for approximately 266,000 deaths of women, with sub-Saharan Africa and East Africa having the highest burden. In Uganda about 2,275 new cervical cancer deaths occur annually. The main objective of the study was to describe the magnitude, trends, clinical stage on presentation and show the importance of cervical cancer prevention and radiotherapy services at Mbarara Regional Referral Hospital. **Methods:** This was a descriptive cross-sectional study. In the first phase of the study, leading cancers at Mbarara Regional Referral Hospital were determined. In the second phase of the study, the burden of cervical cancer on the gynecological ward was determined. In the third part of the study the trends of cervical cancer over a ten year period was determined. In the fourth phase of the study the effects of acetic acid screening on the trends of cervical cancer was determined. **Results:** With a proportion of 25.2%, cervical cancer is the single leading cancer in the hospital. Cervical cancer contributes 10.1% of all diseases on the gynecological ward and 73.9% of all gynecological cancers. The frequency of cervical cancer more than doubled between 2006 and 2014) with 60.3% of presenting with late stage. The number of cases of early cervical cancer detected had shown a small but steady increase since 2009. There was a decline in clinic cervical cancer incidence rate from 3.2% in 2009, 0.9% in 2013. **Conclusion:** Cervical cancer is the leading cancer and also the leading gynecological cancer at Mbarara Regional Referral Hospital. Women with cervical cancer are diagnosed late. Screening increases the rate of early detection. Acetic acid screening is effective in reversing the trends of cervical cancer. Expanding cervical cancer preventive services is capable of reducing the burden of cervical. **Recommendations:** There is need for expansion of HPV vaccination. There is need for expansion of acetic acid cervical cancer screening in southwestern Uganda. There is need for making radiotherapy services more accessible in developing countries.

Keywords: Cervical Cancer, Magnitude, Trends, Stages, Impact, Acetic Acid, Screening, Radiotherapy.

BACKGROUND

Globally, cervical cancer is the fourth most common cancer affecting women after breast, colorectal, and lung cancers. It is also the fourth most common cause of cancer death where it was accountable for approximately 266,000 deaths of women in 2012 worldwide. The global incidence of cervical cancer is 528,000 new cases every year. In sub-Saharan Africa, 34.8 new cases of cervical cancer are diagnosed per 100,000 women per year and is accountable to 22.5 deaths per 100,000 women annually (Ferlay et al., 2013). In Africa and in the developing countries cervical cancer is the most common cancer affecting women, second only to breast cancer worldwide (Franco et al., 2001). It is also the leading cause of cancer related death among women in Eastern, western and middle Africa (Ferlay et al., 2010). The greatest burden of cervical cancer is in sub-Saharan Africa with East Africa having the highest burden of cervical cancer in the World (Ferlay et al., 2013).

In Uganda about 2,275 new cervical cancer deaths occur annually (estimations for 2012). The age standardized incidence is at 45.6/100,000, while the age standardized mortality is at 25/100,000 (Tobian et al., 2009). It ranks as the 1st cause of female cancer deaths and the leading cause of cancer deaths in women aged 15 to 44 years (ICO HPV Information Centre, 2015). Wabinga found that cervical cancer is the most frequent cancer in Uganda with an overall trend of an increase of 1.8% annually (Wabinga et al., 2014).

Cervical Intraepithelial Neoplasia (CIN) precedes almost all cervical cancers. The screening for cervical dysplasia and an appropriate management in women with CIN are effective methods for preventing cervical cancer (Sellors and Sankaranarayanan, 2003). Prolonged exposure to multiple high risk HPV strains (16, 18, 31, and 45) contributes to a greater risk of precancerous lesions. Virtually all cases of cervical pre-cancer and cancer are associated with a high-risk human papillomavirus (hrHPV) infection, with types 16 and 18 accounting for the majority of the cases (Clifford et al., 2003, Vuyst et al., 2012). Different risk factors play a role in progression, from persistent hrHPV infection to cervical pre-cancer and finally to cancer (Castellsagué et al., 2006).

The natural history of cervical cancer follows a prolonged period of a pre-malignant disease stage, commonly described as CIN (cervical intraepithelial neoplasia) which can take as up to 10 years before the progression to invasive cancer. This implies that there is sufficient time for the women to be screened for cervical cancer and receive the appropriate treatment. However among HIV infected women, the risk of developing cervical cancer is 10 years earlier than in the general population, with a high rate of progression to an advanced disease with a poor prognosis (Lim, 2002). A study conducted among attendees at the Makongoro Clinic in Mwanza Region Tanzania found the prevalence of Squamous Intraepithelial Lesion (SIL) to be 7%; HPV was 34%, whereby 83% of HPV was of high risk oncogenic strains (Kapiga et al., 1999). The prevalence of HIV among women in the reproductive age group (15-49 years) in Uganda is 8.3%. The national HIV prevalence is 7.3% while its prevalence in south Western Uganda is 8%. This is a relatively high prevalence rate (MoH, 2012). Despite knowledge of the gravity of cervical cancer and prevention by screening using a Pap smear, attitudes and practices towards screening were negative. The medical workers who should be responsible for opportunistic screening of women they care for are not keen on getting screened themselves. There is need to explain/understand the cause of these attitudes and practices and identify possible interventions to change them. Medical students leave medical school without adequate skills to be able to effectively screen women for cervical cancer wherever they go to practice. Medical students and nurses training curricula needs review to incorporate practical skills on cervical cancer screening (Mutya et al., 2006).

The aim of the study was to show that improving cervical cancer treatment and preventive services can reduce the burden of cancer at Mbarara Regional Referral Hospital (MRRH). The main objective of the study was to describe the Magnitude, Trends, Clinical stage at Presentation, the Role of acetic acid screening and show the need for cervical cancer prevention and radiotherapy services at Mbarara Regional Referral Hospital, Southwestern Uganda. To our knowledge, this is one of the first studies in Uganda to investigate the effects of an acetic acid screening program on the trends of cervical cancer.

METHODS AND MATERIALS

Study design:

The study design was a descriptive cross-sectional study

Study site:

Mbarara Regional Referral Hospital is a teaching hospital for Mbarara University of science and Technology and a Regional Referral Hospital for south western Uganda. MRRH is located in Mbarara municipality, Mbarara district, South Western Uganda, located 280 kilometers from the capital, Kampala. The hospital is owned and financed by the Government of Uganda through Ministry Of Health and serves 5 million people and 10 districts including the neighboring countries of Tanzania, Rwanda and Democratic Republic of Congo. The hospital delivers about 10,000 mothers annually (Atukunda EC et al, 2014).

The study was done in Mbarara Regional Referral Hospital (MRRH) in south western Uganda. The hospital offers cervical cancer screening, colposcopy, cervical pre-cancer and cervical cancer treatment using Cryotherapy, LEEP and cone biopsy for cervical pre-cancer and modified hysterectomy for early invasive cancer respectively.

Study procedures:

The study was done in four phases. The method of sampling was by consecutive sampling using secondary data where by records of patients who presented to the hospital were reviewed. In the first phase of the study, leading cancers at Mbarara Regional Referral Hospital were determined from the summary of hospital records from January to December 2015 and then the proportion of cervical cancer in relation to all the cancers at the hospital was determined. In the second phase of the study the burden of cervical cancer in the department of obstetrics

and gynecology was determined by reviewing records of all women admitted to the gynecology between 2013 and 2014. The proportion of cervical cancer in relation to all gynecological diseases was determined. In the third part of the study hospital records from 2004 to 2014 were reviewed to determine the trends of trends of cervical cancer over a ten year period. In the fourth phase of the study the effects of acetic acid screening on the trends of cervical cancer among women from Mbarara district who attended the colposcopy clinic from 2009 to 2014 was determined.

Statistical analysis:

The data was entered in an EXCEL spreadsheet and analyzed using SPSS statistical software, version 20 (SPSS, Chicago, IL, USA). Cross tabulations was conducted to obtain descriptive statistics which were presented as frequencies, percentages.

Ethical approval:

Ethical approval to carry out the study was obtained from Mbarara University of Science and Technology Institutional Review Board (MUST IRB). The ethical clearance number is 18/11-15

RESULTS:

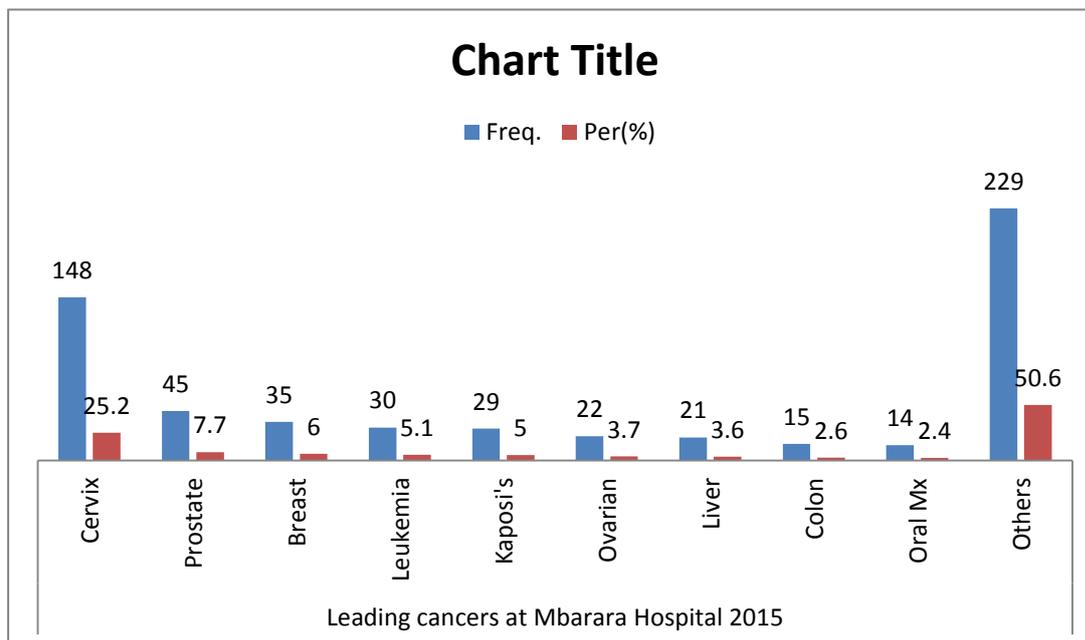
In the first part of the study, the records revealed that a total of 588 patients with different types of cancers had attended the hospital in the year 2015, with a proportion of 25.2%, cervical cancer was the single leading cancer in the hospital contributing to nearly one quarter of all the cancers, (Table 1 and Fig 1). In the second part of the study, a total of 3192 files were reviewed in order to determine the magnitude of cervical cancer on the gynecological ward in the department. Whereas cervical cancer contributed 10.1%, when grouped together the gynecological cancers contributed 13.3 %, (Table 2). In the third part of the study, a total of 1185 records of women admitted with gynecological cancers were reviewed for a period of 12 years (2004-2014). The most frequent malignant tumor was cervical cancer (Table 4 and Fig 2). When we compared cervical cancer with other gynecological cancers we found that cervical was the highest gynecological cancer with a proportion of 73.9% followed by ovarian cancer with a percentage of 8.9 %, (Table 3). For us to determine the clinical stage of cervical cancer at the time of admission, we reviewed records of a total of 219 women with cervical cancer staged between 2004 and 2013. The mode stage on admission was 3B with a percentage of 24% (53/219). Records also revealed that 60.3% of the patients presented with late stage of the disease (Table 5, Fig 3 and Fig 4). Results also revealed that though late presentation is still the norm, the number of early cervical cancer detected has shown a small but steady increase since 2009. A total of 22,399 women were screened for cervical cancer (CXCA) at the Colposcopy and cervical pathology (CCP) clinic in Mbarara Regional Referral Hospital, SW Uganda in a period of seven years (2009-2015). Of these 748 women (3.3%) had invasive cervical cancer, 22.9% of the women with invasive cervical cancer were from Mbarara district, (Tab 7 and Fig 5). There was a decline in clinic incidence rate from 3.2% in 2009 to 0.9% in 2013 and 1.4% in 2015, (Table 8 and Fig 6). There was marked decline in cervical cancer among women from Mbarara district who were less than 50 years of age, (Tab 9 and Fig 7).

Table: 1 Leading Cancers at Mbarara at Regional Referral Hospital, 2015

Type of cancer	Frequency (%)
Cervical cancer	148(25.2)
Prostate cancer	45(7.7)
Breast cancer	35(6.0)
Leukemia	30(5.1)
Kaposi's sarcoma	29(5.0)
Ovarian cancer	22(3.7)
Liver cancer	21(3.6)
Colon cancer	15(2.6)
Oral cancer	14(2.4)
Others	229(50.6)
Total	588(100)

*Cervical cancer was the single leading malignancy Mbarara Regional Referral Hospital in 2015.

Fig: 1, Frequency of leading cancers at Mbarara Regional Referral Hospital



Cervical cancer is the leading single cancer at Mbarara Regional Referral Hospital (25.2%).

Table: 2, Frequency of diseases on the gynecology ward of Mbarara hospital

Disease condition	Frequency (%)
Abortion	1554(48.7)
Ectopic	139(4.4)
Molar pregnancy	69(2.2)
Cervical cancer	232(10.1)
Endometrial cancer	42(1.3)
Ovarian cancer	48(1.5)
Vulva cancer	09(0.3)
Vaginal cancer	02(0.1)
Warts	20(0.6)
Pelvic abscess	79(2.5)
PID	100(3.1)
Perineal tear	56(1.8)
Genital prolapse	78(2.4)
Fistula	137(4.3)
Bartholins cyst	23(0.7)
Uterine fibroids	171(5.4)
Ovarian cyst	70(2.2)
Missing	35(1.1)
Other	328(10.3)

Table 3: Magnitude of cervical cancer vs. other gynecological Cancers at MRRH, 2004-2014

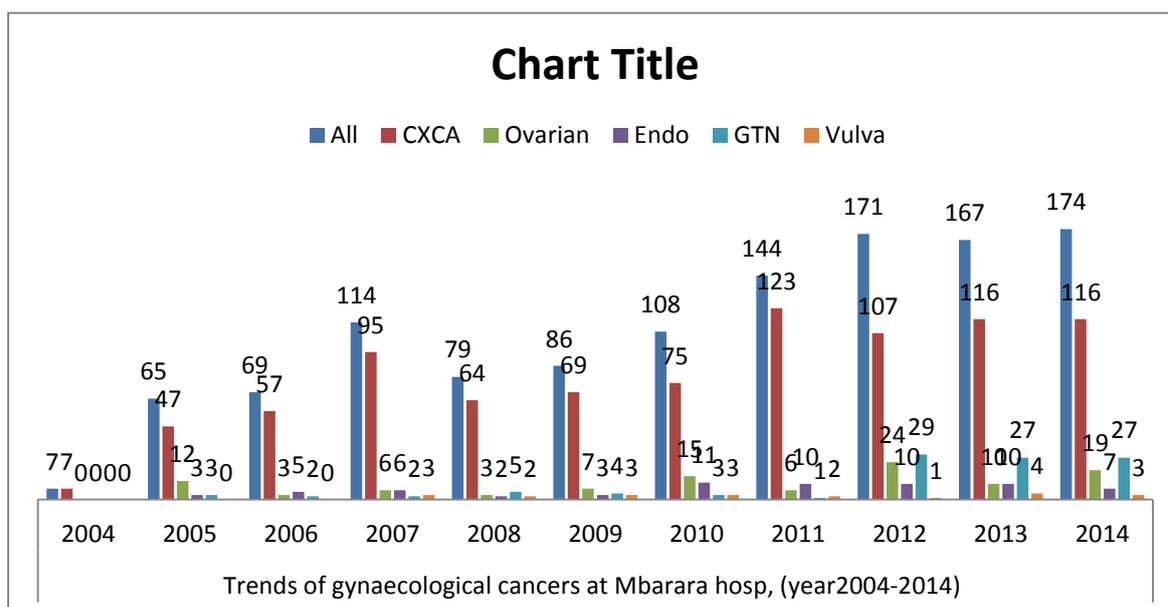
Diagnosis	Frequency
Cervical cancer	876(73.9)
Endometrial cancer	67(5.7)
Ovarian cancer	105(8.9)
Vaginal cancer	11(0.9)
Vulva cancer	21(1.8)
GTN	103(8.7)
Sarcoma Botyroides	1(0.1)
Missing	1(0.1)

Cervical cancer is the most frequent gynaecological cancer at Mbarara Regional Referral Hospital.

Table: 4 Trends of cervical and other gynecological cancers at MRRH

Year	CxCa	Endo	Ova	Vag	Vulva	GTN	Bothyroides	Total
2004	7	0	0	0	0	0	0	7
2005	47	3	12	0	0	3	0	65
2006	57	5	3	2	0	2	0	69
2007	95	6	6	2	3	2	0	114
2008	64	2	3	3	2	5	0	79
2009	69	3	7	0	3	4	0	86
2010	75	11	15	1	3	3	0	108
2011	123	10	6	2	2	1	0	144
2012	107	10	24	0	1	29	0	171
2013	116	10	10	0	4	27	0	167
2014	116	7	19	1	3	27	1	174
Total	876(73.9)	67(5.7)	105(8.9)	11(0.9)	21(1.8)	103(8.8)	1(0.1)	1185

Figure: 2 Shows trends of cervical and other gynecological cancers at MRRH 2004-2014



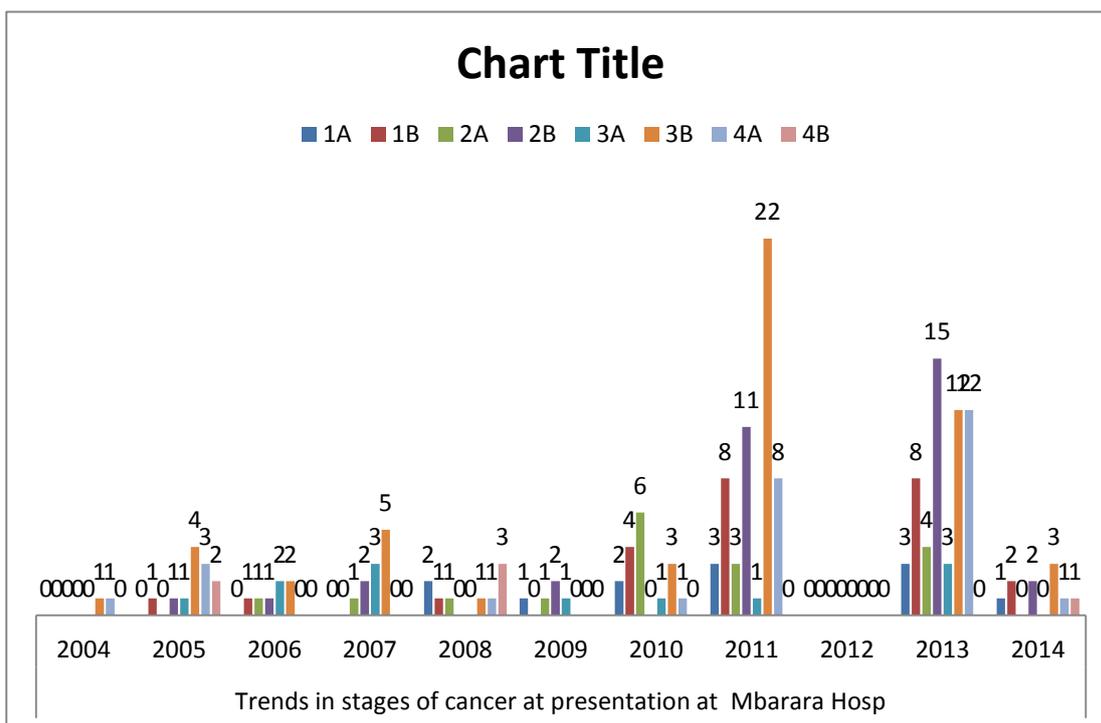
There is an increasing trend of all gynecological cancers at Mbarara Regional Referral Hospital, which may be apparent or real

Table: 5, Clinical stages of cervical cancer at presentation to Mbarara Reg. Ref. Hospital

YAER	1A	1B	2A	2B	3A	3B	4A	4B
2004	0	0	0	0	0	1	1	0
2005	0	1	0	1	1	4	3	2
2006	0	1	1	1	2	2	0	0
2007	0	0	1	2	3	5	0	0
2008	2	1	1	0	0	1	1	3
2009	1	0	1	2	1	0	0	0
2010	2	4	6	0	1	3	1	0
2011	3	8	3	11	1	22	8	0
2012	0	0	0	0	0	0	0	0
2013	3	8	4	15	3	12	12	0
2014	1	2	0	2	0	3	1	1
Total	12	25	16	34	12	53	27	6

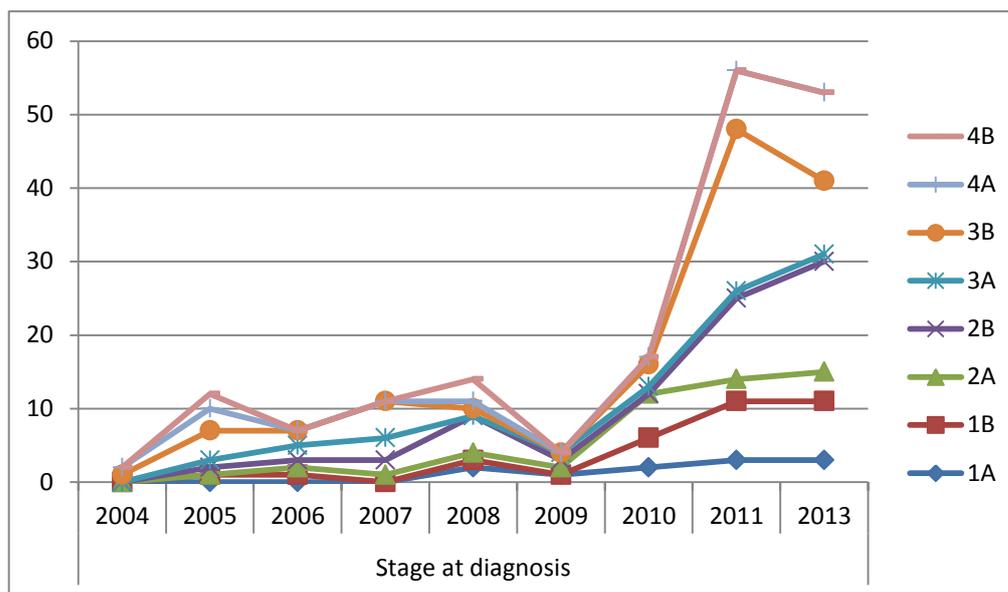
A total of 219 women with cervical cancer were staged between 2004 and 2014.

Figure: 3 Trends in presentation of cervical cancer over a 12 years period at MRRH



Most women presented with advanced stage, mainly stage 3B at the time of diagnosis. There is also a slight increase in early stage disease since 2009.

Figure: 4 A line graph showing trends of cervical cancer over a 12 year period at MRRH.



The Fig. shows a slight increase in early disease at presentation since initiation of acetic acid screening in 2009.

Table: 6, Trends of cervical cancer at the Colposcopy and cervical pathology clinic at MRRH.

Year	No Cancer	Cancer (%)	Total
2009	778	47(5.7)	825
2010	1704	98(5.4)	1802
2011	2571	116(4.3)	2687
2012	4509	99(2.1)	4608
2013	4523	120(2.6)	4643
2014	3539	120(3.3)	3659
2015	4027	148(3.5)	4175
Total	21651	748(3.3)	22399

Table: 7, DISTRIBUTION OF CERVICAL CANCER BY DISTRICT AT MRRH ,2009-2015

DISTRICT	FREQ	%
BUSHENYI	140	18.7
FOREIGN	6	0.8
IBANDA	37	4.9
ISINGIRO	106	14.2
KAMWENGE	27	3.6
KIRUHURA	61	8.2
MBARARA	171	22.9
NTUNGAMO	47	6.3
RUKUNGIRI	21	2.8
OTHER	108	14.4
UNKNOWN	24	3.2
TOTAL	748	100

Fig: 5 Distribution of cervical cancer by district at the CCP clinic in Mbarara hospital by district.

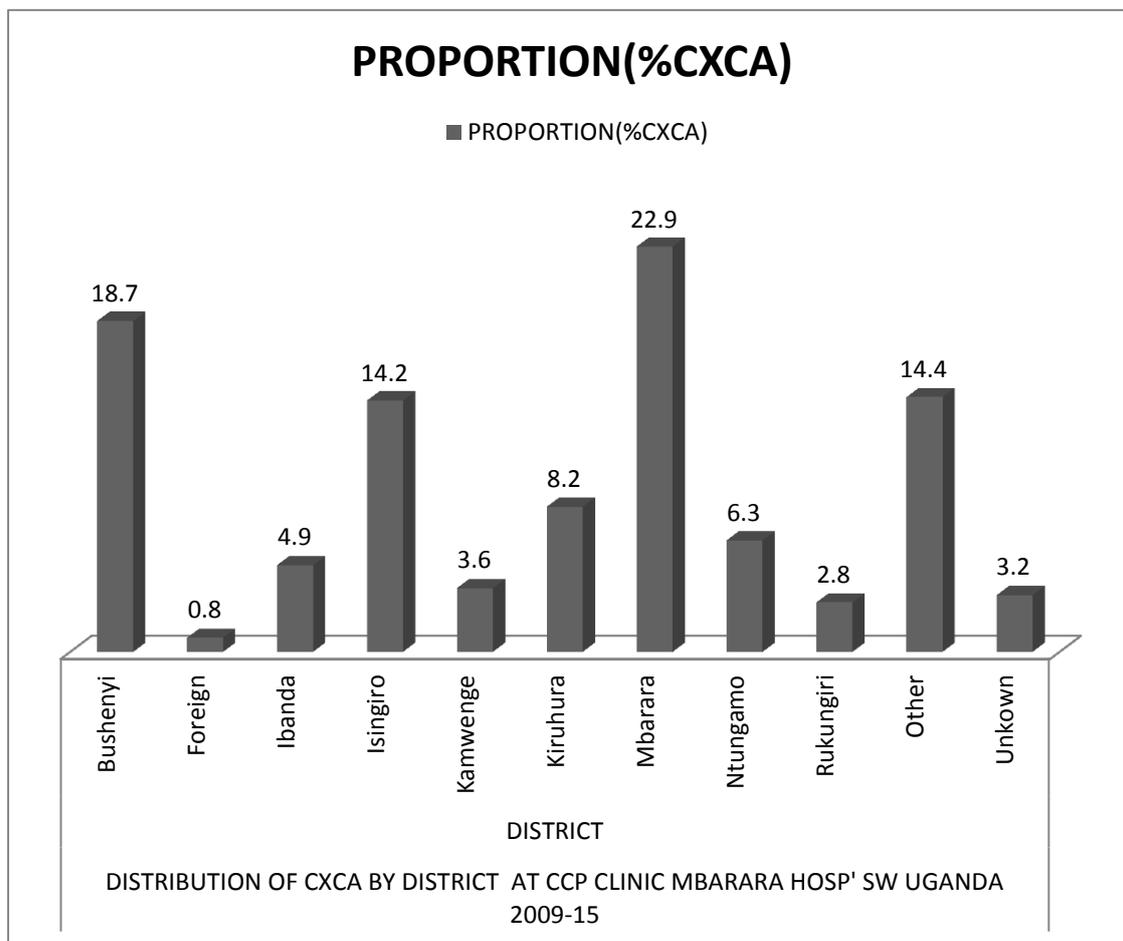
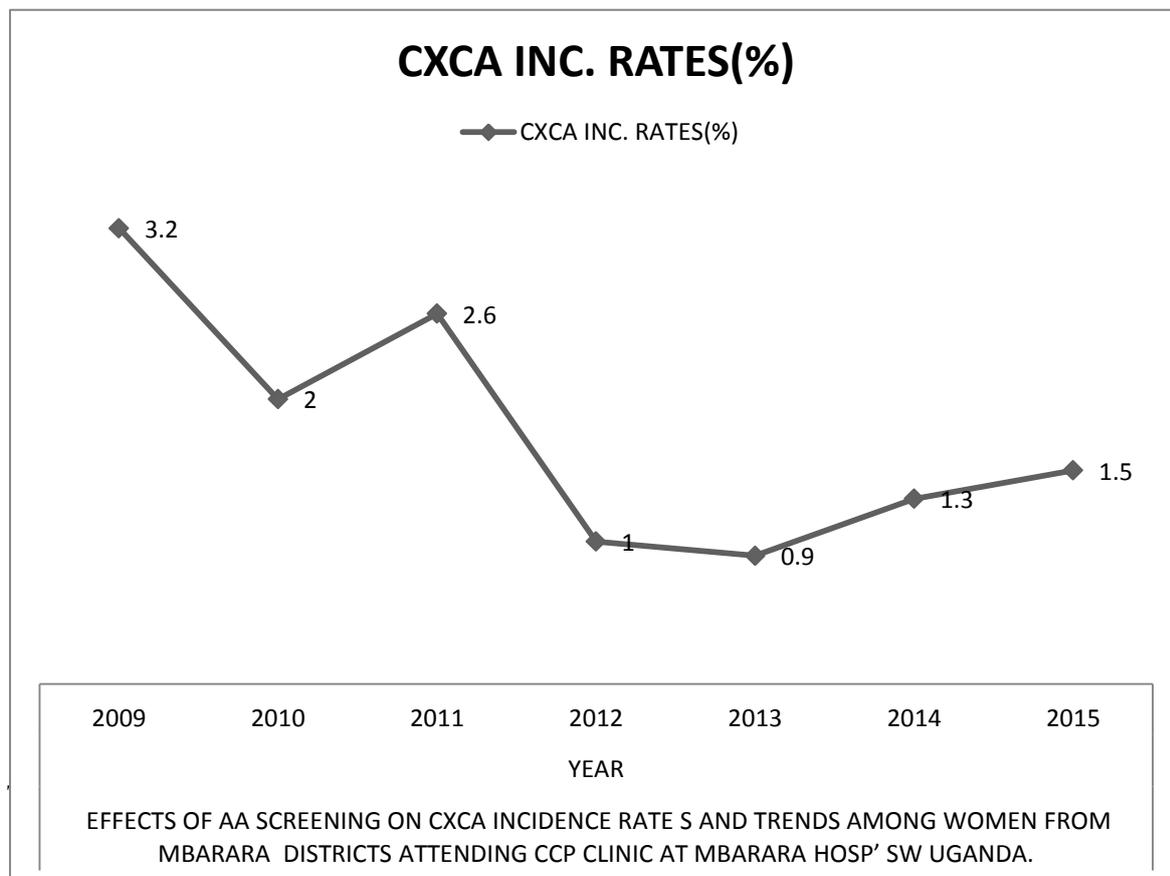


Table: 8, Effects of acetic acid screening on cervical cancer incidence rates and trends among women from Mbarara districts attending CCP clinic at Mbarara hospital.

Year	No Cancer	Cancer (%)	Total
2009	423	14(3.2)	437
2010	961	20(2.0)	981
2011	1390	35(2.6)	1425
2012	2479	24(1.0)	2503
2013	2539	22(0.9)	2561
2014	1900	25(1.3)	1925
2015	2074	31(1.5)	2105
TOTAL	11766	171(1.4)	11937

Fig: 6, effects of acetic acid screening on trends of cervical cancer at MRRH

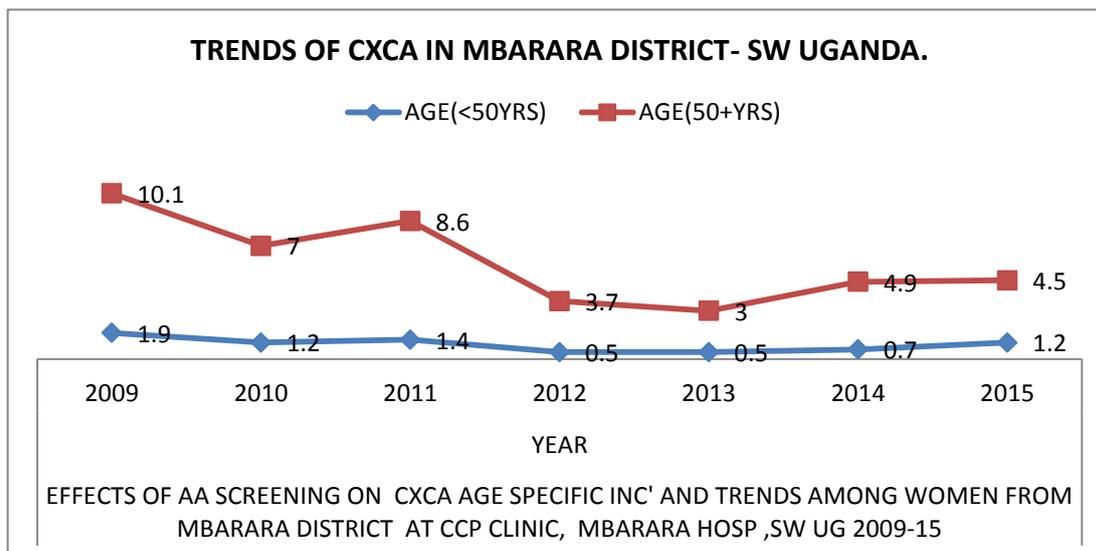


There has been a fall in cervical cancer clinic incidence at Mbarara Regional Referral Hospital since 2009.

Table: 9 Age specific incidence rates and trends among women from Mbarara district who attended CCP clinic at MRRH 2009-2015.

Year	Age <50years			Age >50years		
	No cancer	Cancer (%)	Total	No cancer	Cancer (%)	Total
2009	359	7(1.9)	366	62	7(10.1)	69
2010	820	10(1.2)	830	133	10(7.0)	143
2011	1177	17(1.4)	1194	170	16(8.6)	186
2012	2070	11(0.5)	2081	309	12(3.7)	321
2013	1995	10(0.5)	2005	358	11(3.0)	369
2014	1560	11(0.7)	1571	253	13(4.9)	266
2015	1735	19(1.2)	1754	233	11(4.5)	244

Fig: 7 Age specific trends of CXCA among women from Mbarara district who attended the CCP clinic at MRRH (2009-2015).



Discussion of results

The aim of the first part of the study was to determine the leading cancers at Mbarara Regional Referral Hospital. The search revealed that a total of 588 patients with different types of cancers had attended the hospital in the year 2015. With a proportion of 25.2%, cervical cancer was the leading cancer in the hospital contributing to nearly one quarter of all the cancers in the hospital. It is important to know the disease magnitudes because the estimation of cancer burden is valuable to set up priorities for disease control. The comprehensive global cancer statistics from the International Agency for Research on Cancer indicate that gynaecological cancers accounted for 19% of the 5.1 million estimated new cancer cases, 2.9 million cancer deaths and 13 million 5-year prevalent cancer cases among women in the world in 2002. Cervical cancer accounted for 493 000 new cases and 273 000 deaths; uterine body cancer for 199 000 new cases and 50 000 deaths; ovarian cancer for 204 000 new cases and 125 000 deaths; cancers of the vagina, vulva and choriocarcinoma together constituted 45 900 cases. More than 80% of the cervical cancer cases occurred in developing countries and two-thirds of corpus uteri cases occurred in the developed world. Political will and advocacy to invest in healthcare infrastructure and human resources to improve service delivery and accessibility are vital to reduce the current burden in low- and medium-resource countries(Sankaranarayanan and Ferlay, 2006)

The second part of the study was done on the gynecological ward in the department of obstetrics and gynecology. A total of 3192 files were reviewed in order to determine the magnitude of cervical cancer on the gynecological ward in the department. Whereas cervical cancer contributed 10.1% of all gynecological admissions, the gynecological cancers contributed 13.3%. When we compared cervical cancer with other gynecological cancers we found that cervical was the highest gynecological cancer with a proportion of 73.9% followed by ovarian cancer with a percentage of 8.9%. Cancer of the cervix is the commonest gynecological malignancy among women in Uganda contributing about 80% of all female malignancies. The incidence rate is 40:100,000. It is the leading cause of cancer related deaths in females in Uganda. Unfortunately 80% of the patients present late and this makes treatment outcomes unsatisfactory. Most patients can only be treated palliatively. It is therefore important that the disease be detected in early stages so as to improve outcomes(Kiguli-Malwadde et al., 2005). Cervical cancer is the second most common cancer in women worldwide and the leading cause of cancer deaths in developing countries. While incidence and mortality rates of cervical cancer have fallen significantly in developed countries, 83% of all new cases that occur annually and 85% of all deaths from the disease occur in developing countries. Cervical cancer is the most common cancer among women in sub-Saharan Africa. The incidence is on the increase in some countries, the knowledge and awareness of this disease on the continent are very poor and mortality still very high. Facilities for the prevention and treatment of cervical cancer are still very inadequate in many countries in the region. Governments in sub-Saharan Africa must recognize cervical cancer as a major public health concern and allocate appropriate resources for its prevention and treatment, and for research. Indeed, cervical cancer in this region must be

accorded the same priority as HIV, malaria, tuberculosis and childhood immunizations.(Anorlu, 2008)

The aim of the third part of the study was to determine the trends of cervical cancer in the department of obstetrics and gynecology. A total of 1185 records of women admitted with gynecological cancers were reviewed for a period of 12 years (2004-2014). The most frequent tumor was cervical cancer. Whereas all gynecological cancers have shown an increase in frequency, the frequency of cervical cancer has more than doubled since 2006(56 cases in 2006 to 116 cases in 2014). We further discovered that all gynecological cancers had shown an increase over the period. Re-establishment of the cancer registry in Kyadondo County, Uganda, has allowed estimation of incidence rates for the period September 1989 to December 1991. The results are compared with earlier data from the same area, and from other African cancer registries. The most striking feature is the emergence of Kaposi's sarcoma as the leading cancer in males (almost half of all registered cases) and the second most frequent (17.9%) in females. This parallels the evolution of the epidemic of AIDS. There were also marked increases in the incidence of both oesophageal and prostatic carcinoma, while the incidence of cancer of the penis and the urinary bladder declined, possibly as a result of improved standards of hygiene. In females, the incidence of cancer of the cervix has more than doubled since the 1950s, and is now among the highest recorded in the African continent(Wabinga et al., 1993)

For us to determine the clinical stage of cervical cancer at the time of admission, records of a total of 219 women with cervical cancer staged between 2004 and 2013 were reviewed. The mode stage on admission was 3B with a percentage of 24% (53/219). Records also revealed that 60.3% of the patients presented with late stage of the disease (Stage 2B and above), therefore were inoperable and hence required radiotherapy. Cancer of the cervix is the commonest gynecological malignancy among women in Uganda contributing about 80% of all female malignancies. The incidence rate is 40:100 000. It is the leading cause of cancer related deaths in females in Uganda. Unfortunately 80% of the patients present late and this makes treatment outcomes unsatisfactory. Most patients can only be treated palliatively. It is therefore important that the disease be detected in early stages so as to improve outcomes(Kiguli-Malwadde et al., 2005).

Results also revealed that though late presentation is still the norm, the number of early cervical cancer detected has shown a small but steady increase since 2009.This could be attributed to initiation of an acetic acid based cervical cancer screening at the hospital by a program that was initiated and initially supported by Program for Appropriate Technology in Health (PATH) in 2009.

The last part of the study was carried out among women attending the colposcopy clinic at Mbarara Regional Referral Hospital from 2009 to 2015. The purpose of the study was to describe the effects of acetic acid screening program on the trends of cervical cancer among women from Mbarara district, in South Western Uganda. To our knowledge, this is one of the first studies in Uganda to investigate the effects of an acetic acid screening program on the trends of cervical cancer. There was a decline in clinic incidence rate from 3.2% in 2009 to 0.9% in 2013 and 1.4% in 2015. Showing a decline of more than 50% in the first 5years (2009-2013). There was marked decline in cervical cancer among women from Mbarara district who were less than 50 years of age. Our study provides evidence that acetic acid based screening is capable of reducing the incidence of cervical cancer. The findings of this study are consistent with the studies on the trends of cervical cancer mortality in South Africa, effects of screening for cancer in Nordic countries and their association with organized screening programs, and the study on the trends of cervical cancer on the member states of the European Union which all suggest that to a large extent , cervical cancer can be well avoided by screening and treatment of screen-detected cervical lesions(Bailie et al., 1996, Läärä et al., 1987). Wabinga H R in 2014 also noted that where as cancer of the cervix was always the most frequent cancer of women and had shown an increase of 1.8% per year(1991-2010), there had been a decline in the last 4 years of the study(Wabinga et al., 2014).There is limited information on why there was a decline in the last 4 years of the study but he noted that this is most likely because of the governments' emphasis on cervical cancer screening (WABINGA, H. R et al 2014). Both screen-and-treat approaches are safe and result in a lower prevalence of high-grade cervical cancer precursor lesions compared with delayed evaluation at both 6 and 12 months(Blumenthal et al., 2005).

To date, cervical cancer prevention efforts worldwide have focused on screening sexually active women using cytology smears and treating pre-cancerous lesions. It has been widely believed that invasive cervical cancer develops from dysplastic precursor lesions, progressing steadily from mild to moderate to severe dysplasia, then to carcinoma in situ and finally to cancer(Sankaranarayanan et al., 2001). Even though the impact of cytology screening has never been proved through randomized trials, it has been shown to be effective in reducing the incidence and mortality from cervical cancer in developed countries(Hakama et al., 1985).

Studies were done to estimate the sensitivity and specificity of visual inspection using acetic acid as a primary screen for cervical intraepithelial neoplasia (CIN).Visual inspection was done on 1997 women aged 35–45 years in a screening trial in rural China. Each woman had colposcopy and at least five cervical biopsies (directed biopsy of lesions, one biopsy at 2, 4, 8, or 10 o'clock at the squamocolumnar junction in each normal quadrant, and an endocervical curettage). Forty-three women had biopsy-proven CIN II, 31 had CIN III, and 12 had

invasive cancer. In two women only the endocervix was positive (one with CIN II and one with CIN III). Visual inspection yielded normal results in 1445 women (72%), low-grade intraepithelial neoplasia in 525 (26%), high-grade in 21 (1%), and cancer in six (0.3%). With abnormal visual inspection defined as low-grade intraepithelial neoplasia or worse, the sensitivity for detecting biopsy proven CIN II or worse was 71% (61 of 86, 95% confidence interval [CI] 60%, 80%); the specificity was 74% (1420 of 1911, 95% CI 72%, 76%); the sensitivity was 65% for smaller lesions (37 of 57, 95% CI 51%, 77%), and 89% for larger lesions (24 of 27, 95% CI 71%, 98%) ($P = .03$). It was concluded that the sensitivity of visual inspection equaled or exceeded reported rates for conventional cervical cytology. Visual inspection and colposcopy have similar specificity profiles for CIN II and greater. It was recommended that the benefit of an inexpensive point-of-care diagnosis and treatment algorithm will be a powerful incentive to pursue visual inspection for cervical cancer screening in developing countries. (Belinson et al., 2001)

Review of many studies was done and it was found that developing countries often lack the necessary resources to use the Papanicolaou (Pap) smear as a screening tool for cervical abnormalities. Because the burden of cervical cancer is highest in such low-resource settings, alternative techniques have been sought. Recently, interest in visual inspection with acetic acid (VIA) has increased. Numerous studies have been conducted on its accuracy and its ability to detect cervical lesions when compared with other techniques, both conventional and nonconventional. Sensitivity ranged between 66% and 96% and specificity between 64% and 98%. It was noted that when a comparison was made between VIA with cytology overall usefulness of VIA compares favorably with that of the Pap test. It was concluded that VIA has the potential to be a cervical cancer screening tool, especially in low resource settings. (Gaffikin et al., 2003). At Mbarara Regional referral Hospital we used visual inspection with acetic acid as the primary screening tool for women between 25 and 49 years and a few Pap smears for older women and managed to reduce the cervical cancer clinic incidence in the last 7 years.

Conclusion

Cervical cancer is the leading cancer in Mbarara Regional Referral Hospital. Cervical cancer is the leading gynecological cancer. Most women with cervical cancer are diagnosed with late stage disease. With screening there is a small but steady increase in early disease at the time of diagnosis. An organized acetic acid screening program is effective in reversing the trends of cervical cancer. Expanding cervical cancer preventive services is capable of reducing the burden of cervical in Mbarara Regional Referral Hospital 25% and the burden of gynecological cancers in the department of obstetrics and gynecology by 73%.

Recommendations

There are a large number of women in developing countries who are at risk of cervical cancer. Due to lack of wide spread organized screening and given the fact that cervical cancer is initially asymptomatic, most of these women are likely to be diagnosed with late disease. Therefore there is need for making radiotherapy services more accessible in developing countries. There is need for expansion of cervical cancer screening services in southwestern Uganda. We recommend training of more service providers in visual inspection with acetic acid and expansion of VIA services. There is urgent need for expansion of HPV vaccination.

Competing interests:

Authors did not have any conflict of interest

Authors' contributions:

- 1: Mayanja Ronald.MD, Principal investigator, conceived the idea, developed the concept, involved in data collection, entry, analysis and manuscript writing.
- 2: Chakura Andrew, MD, involved in data collection, entry, analysis and manuscript writing.
- 3: Njagi Joseph. MD, manuscript writing.
- 4: Masembe Sezalio.MD,. MD, manuscript writing.
- 5: Ngonzi Joseph. MD, developed the concept, manuscript writing and submission.

Authors' information:

- 1: Mayanja Ronald, MBChB(MUST), MMed O&G(MU), Lecturer, Department of obstetrics and Gynaecology, Mbarara University of Science and Technology, Uganda
- 2: Masembe Sezalio, MBChB(MUST), chief resident MMed Department of obstetrics and Gynaecology, Mbarara University of Science and Technology, Uganda
- 3: Aheisibwe Hillary, MBChB(MUST), Medical Officer, Kabale Regional Referral Hospital, Uganda.
- 5: Chakura Andrew, MBChB(MUST), chief resident MMed Department of obstetrics and Gynaecology, Mbarara University of Science and Technology, Uganda
- 6: Joseph Ngonzi, MBChB(MUST), MMed O&G(MUST), PhD candidate, Senior lecturer, Chair Department of obstetrics and Gynaecology, Mbarara University of Science and Technology, Uganda

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