Outcomes and Utilization of Cervical Cancer Screening Services Amongst Women Attending United Bulawayo Hospitals Cancer Screening Clinic: A Secondary Data Analysis from 2018 to 2020.

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Abstract

Background: Visual Inspection with Acetic Acid and Cervicography (VIAC) is a screening method used to see and treat pre-cancerous cervical lesions. United Bulawayo Hospitals (UBH) is a tertiary government hospital that has an established VIAC Clinic that offers free services to the southern region of Zimbabwe. The utilization and outcomes of VIAC screening method become important in mapping the policies going into the future. We performed a retrospective descriptive study analysing data from 2018 to 2020 to assess outcomes and utilization of Cervical Cancer Screening Services.

Method: We conducted a retrospective descriptive cross-sectional study using data collected from the United Bulawayo Hospitals VIAC Clinic. We analysed all records of clients who utilized VIAC services at the referral facility from 2018 to 2020.

Results: From the records, a total of 15,491 women accessed services at the VIAC Clinic. The VIAC positivity rate was 6.7%, those with suspicion of cancer result were 1.15 % and punch biopsies constituted 2.3 % of patients seen. Of the treatment modalities offered to VIAC positive patients, Loop Electrosurgical Excision Procedure (LEEP) constituted 53%, cryotherapy 15.3%, hysterectomies 12.7%, punch biopsies 18.2%, and thermal ablation 0.8%.

Conclusion: The "See, Screen and Treat" objective in cervical cancer management is being realized at the tertiary hospital. Clients are coming for management from the entire southern region of Zimbabwe. The Ministry of Health should upscale VIAC clinics which are able to offer different treatment modalities in rural areas and also fund community awareness and engagement to increase the number of women coming for cervical cancer screening services.

Introduction

Cervical cancer is the seventh most commonly diagnosed cancer in the world after breast, lung, colorectal, prostate, stomach, and liver cancer respectively(1). It is the fourth most diagnosed malignancy in women worldwide with an estimated 604,000 new cases and 342,000 deaths annually(1). About 85% of the global burden occurs in the less developed regions and third world countries(2). Cervical cancer accounts for about 3.3% of all female cancer deaths worldwide. Most cervical cancer deaths occur in less developed countries with prevalence highest in Asia (59.5%) and Africa (15%) (3). Every year across Africa, 76,745 deaths are recorded in women who are diagnosed with cervical cancer(4) with Sub-Saharan Africa, having the highest burden of disease. According to World Health Organisation (WHO), Zimbabwe has cervical cancer mortality rates of 17.6 % (5), the majority being poor, rural women. Of all the most common cancers in Zimbabwe, cervical cancer has the highest mortality, followed by prostate cancer, oesophageal cancer and breast cancer respectively(5). The incidence of cervical cancer is the highest at 18.3%, followed by breast cancer (10.8%) and Kaposi sarcoma (9.0%) respectively(5).

Most cervical cancers are attributable to Human Papilloma Virus(6) which is sexually transmitted hence most women (greater than 80%) will acquire it during their lifetime(7). The risk factors for cervical cancer

include sexual intercourse at an early age, multiple sexual partners, multi-parity, sexually transmitted diseases, tobacco smoking, long-term combined oral contraceptive use, immunosuppressive therapy and micronutrient deficiency(8, 9). Social predisposing factors such as lack of education, poverty, living further from a health facility or never having had a Human Immunodeficiency Virus (HIV) test were significantly associated with lack of awareness of cervical cancer(10, 11).

The main strategies of cervical cancer prevention include immunization with the Human Papilloma Virus (HPV) vaccine and screening for cervical cancer to detect and remove pre-cancerous lesions(12). HPV vaccines can prevent HPV infection, the cause of cervical cancer. Approximately 70% of cervical cancers are caused by HPV 16 and HPV 18 subtypes(12, 13). HPV vaccines are recommended for girls aged 9 to 14 years, before coitarche. All women, especially those aged 30–49 years, should undergo a screening test to determine if they have pre-cancerous cervical lesions or if there is a high risk of developing one due to an HPV infection. Three different early detection tests are currently available: HPV DNA test, PAP (Papanicolaou) test and Visual Inspection with Acetic Acid (VIA) or lugols iodine. The type of test used may vary from country to country, depending on the national guidelines(14–16). In May 2018, the WHO issued a call for the elimination of cervical cancer globally and many countries as well as international academic societies acted positively. Thereafter, in 2020 WHO released the global strategy to accelerate the elimination of cervical cancer as a public health problem and to spearhead cervical cancer prevention and control in the future. Regular screening and early treatment, which is called screen and treat, significantly decreases the incidence of cervical cancer(17). In Zimbabwe, the “See, Screen, and Treat” strategy was adopted in 2012 as many VIAC clinics, especially the one at United Bulawayo Hospitals, had shown the efficacy of this method. Immunization with the Human PapillomaVirus (HPV) vaccine for prepubertal girls has also been rolled out throughout the country of Zimbabwe(18).

Visual Inspection with Acetic Acid and Cervicography (VIAC) entails performing a vaginal speculum examination during which a health care provider applies 3–5% acetic acid or Lugols iodine (VILI) to the cervix. Abnormal pre-cancerous tissue on the cervix temporarily appears white when exposed to acetic acid. In Schiller’s test where Lugols iodine is used, pre-cancerous lesions and invasive cancer do not take up iodine (as they lack glycogen) and appear as well-defined, thick, mustard or yellow areas(19). Viewing of the cervix can be done with the naked eye or with a digital camera to identify colour changes on the cervix. Patients who have a VIAC positive result can then undergo one of the treatment modalities offered. These treatment modalities include Loop Electrosurgical Excision Procedure (LEEP) and ablation techniques such as cryotherapy, cone biopsy and cauterization(20).

United Bulawayo Hospitals VIAC Clinic is a referral centre at a tertiary institution. It offers its services free of charge and is sustained by partners and the Government of Zimbabwe. The catchment area for UBH VIAC Clinic includes Bulawayo City and satellite clinics, Matabeleland North and South, Masvingo and Midlands provinces.

Method

This was a descriptive cross-sectional study using retrospective data from medical records of women attending the VIAC Clinic at United Bulawayo Hospitals from 1 January 2018 to 31 December 2020. The study population included all women who were screened for premalignant lesions of cervical cancer at UBH Hospital clinic. No pregnant women were screened at the clinic. Data of interest included the VIAC results (which were positive, negative or suspicious of cancer) and some factors affecting VIAC positivity for example HIV status. Variables also captured in this data set included treatment modalities which were LEEP, cryotherapy and thermal ablation.

We analysed all electronic and manual records of clients that received services at the VIAC Clinic from 1 January 2018 to 31 December 2020. Data was evaluated using Excel and Epi-Info software to generate tables, storing data and calculating variables.

Permission was obtained from the Health Authority Board of United Bulawayo Hospitals to conduct this research.

Data Analysis

Descriptive statistics including frequencies and percentages were used to summarize the data. Data sets were analysed using excel statistical application.

Results

VIAC outcomes.

Of the 3 years analysed in the study from 1 January 2018 to 31 December 2020, 15,491 clients were attended to at the United Bulawayo Hospitals VIAC Clinic. The average VIAC positivity rate was 6.7% for the study period (Table 1). It fluctuated month to month with no obvious trends except in 2020 where it dropped due to the effects of Coronavirus disease (COVID-19) pandemic as shown in Fig. 1. It was 7.6% in both the 2018 and 2019 periods and dropped to 4.8% in 2020 (Table 1).

Table 1
VIAC Outcomes at UBH, 2018–2020

VIAC Outcomes	2018	2019	2020	TOTAL
VIAC patients seen	6543	5604	3344	15491
VIAC positive	497	428	159	1084
VIAC positivity (%)	7.6	7.6	4.8	6.7
HIV positive, VIAC positive (%)	61.4	48.6	55.4	55.1
HIV negative, VIAC positive (%)	28.8	49.1	42.1	40.0
Suspicious of cancer	49	72	57	178
LEEPs done	385	438	200	1023
LEEPs (%) of total patients seen	5.9	7.8	6.0	6.6
Thermal ablations done	0	0	15	15
Cryotherapies done	188	105	3	296
Punch biopsies done	82	187	83	352
Hysterectomies done	55	125	65	245

On average, Table 1 shows that fewer patients were seen in 2020 (3,344 patients) due to the effects of the Coronavirus disease lockdowns, compared to 2018 (6,543 patients) or 2019 (5,604 patients). Of the patients who tested VIAC positive, those who were also Human Immuno-deficiency Virus (HIV) positive were 61.4% in 2018. This then dropped to 48.6% in 2019 and then rose in 2020 to 55.4%. The average percentage of VIAC positive women who were also HIV positive was 55.1% during the study period.

As shown in Table 1, VIAC positive women who were HIV-negative accounted for 28.8% of the patients seen in 2018, 49.1% in 2019, and 42.1% in 2020. On average, VIAC positive HIV-negative women accounted for 40% of patients seen during the 3 years. 178 women in total presented late with lesions that were suspicious of cancer. The percentage of women with a suspicion of cancer result varied between 0.5 and 2% of total clients screened for the 3 years. Of the 15,491 clients seen, Loop Electrosurgical Excision Procedure (LEEP) was offered to 1,023 patients constituting 6.6% of the total clients seen. A total of 245 patients were offered hysterectomy during the 3 years. 55 patients were operated on in 2018, 125 in 2019 and this dropped to 65 in 2020, due to the COVID-19 pandemic lockdowns and reduction of elective operations. Thermal ablation was introduced as a pilot program in 2020 and was offered to 15 patients. As shown in Table 1, Cryotherapy was performed on 296 patients in total, with most (188) being done in 2018, then 105 in 2019 and only 3 in 2020.

Figure 1 shows the outcome of VIAC services at UBH, with VIAC positivity ranging between 7.4 in 2018 to 2019 but dropped to 4.8 in 2020. This drop can be attributed mainly to the effects of the Coronavirus

disease pandemic with some months registering zero client turnout due to lockdown effects. Those who presented with suspicious of cancer rose steadily from 0.7% in 2018 to 1.7% in 2020 as shown in Fig. 1. This may be attributed to more cancer information to the populace leading to them seeking medical help even though the cancer is advanced.

Figure 2 shows that LEEP is the most commonly offered treatment modality for VIAC positive clients, accounting for 53% of procedures done. 15.3% of VIAC positive clients were offered cryotherapy, 12.7% had abdominal and vaginal hysterectomies and only 0.8% had thermal ablation performed. Although punch biopsy is not a treatment modality in the strictest sense, 18.2% of women with lesions were biopsied to confirm the diagnosis of cancer.

Discussion

Close to 80% of invasive cervical cancer cases occur in developing countries, the burden in Africa being more in Sub-Saharan countries, where Zimbabwe is situated(21). In the past, conventional Pap smears were the mainstay of cervical cancer screening in Zimbabwe. However, due to the expense of performing, processing and reporting Pap smears, there has been a growing trend towards performing the less expensive VIAC(22). Pap smear results have been sub-optimal due to lower coverage of women at risk, no standardized quality control systems in place and a lack of follow-up and treatment of positive cases(20). Human Papilloma Virus DNA testing has shown very high sensitivity and is being recommended in resource-rich countries(21). However, its current price and the technical requirements make this option unrealistic for developing countries like Zimbabwe.

The VIAC based "See, Screen, and Treat" approach is feasible. VIAC is low cost, has easy applicability, results are immediately available and do not require referral to a laboratory. It involves one visit hence it is a useful screening test in developing countries (22–24). Its affordability and acceptability to most patients make it a sustainable screening method. The treatment modalities are safe and effective. VIAC based screening is more sensitive and cost-effective than Pap smears, although it is less specific. VIAC screening is relatively easy to teach to health workers and it can be integrated into the gynaecological services already offered at that particular centre. Digital camera enhancement of VIAC model, borrowed from colposcopy, involves the use of a commercial hand-held digital camera to take photographs of the cervix(25). The Cervicograms can then be displayed on a bedside monitor, permitting magnification and detailed examination of the lesion's morphology. This includes the size, margin sharpness, proximity to the transformation zone, degree of extension into the endocervical canal and abnormal vasculature of the lesion. Cervicograms also allows for telemedicine support and the ability to routinely undertake audit meetings to discuss the findings, thus integrating quality assurance in the screening services provided(26).

The prevalence of VIAC positive women in the three years studied was 6.7% (Fig. 1) on average. This is in tandem with studies done in the rest of the country and the region. Gabaza et al in their descriptive cross-sectional study using data collected from the Harare city VIAC program between 2012 to 2016 found a

prevalence of 6.5% (27). The VIAC test positive rate was 10.8% as reported by Fallala and Prof Marsh in their 2010 to 2012 United Bulawayo Hospitals study results(18). This was when the VIAC Clinic had just started and rates were high since most patients were coming for the first time. In most studies, when a VIAC clinic opens, VIAC positive prevalence is high and then steadily comes down. Mwanahamuntu MH in Zambia reported a VIAC prevalence of 27.7% and the VIAC positivity rates declined over time from 47% in 2006 to 17% in 2010. This decline in VIAC positivity directly coincided with the scaling-up of the program(25). The Studies in the Sub Saharan region with countries including South Africa, Angola and Mozambique, reported almost similar VIAC positive prevalence (4.7–8%) (28–30). These countries have a similar burden of pre-cancerous lesions and availability of resources hence are comparable.

Management

The study results, as shown in Fig. 2 above, shows that the majority of patients (53%) who were VIAC positive were treated using LEEP. LEEP entails using a wire with an electrical current passing through it to cut, coagulate and remove tissue around the transformation zone under direct vision. LEEP is the most preferred option and has the advantage of being both a therapeutic and diagnostic procedure(31).

Cryotherapy was offered to 15.3% of the VIAC positive clients (Fig. 2). It is difficult to compare treatment modalities offered at our clinic and those from other studies since this depends on the treatment options available at those clinics. In 2020, cryotherapy probe tips were unavailable at UBH VIAC Clinic, therefore patients who needed cryotherapy were offered LEEP instead, thereby increasing the rate of LEEP. Most patients were not eligible for thermal ablation, moreover it was introduced in 2020, which would explain its lower figures. The safety and effectiveness of VIAC and cryotherapy performed by nurses and LEEP performed by relatively junior doctors in this study were also observed in other studies done in the region(31). Complications included intra-operative and post-operative bleeding which were managed effectively by local measures such as vaginal packing or application of a haemostatic agent or suturing. Other complications included self-limited reactions to anaesthesia and post-operative infections that resolved on oral antibiotics. No major complications were recorded after cryotherapy nor LEEP. Punch biopsies were performed on 18.2% of the patients with cervical lesions. The histology results from a private laboratory would come after 2 weeks (the government hospital laboratory does not have a pathologist). Depending on the histology results and the clinical staging of the cervical lesion, the patient would either be offered hysterectomy (12.7%) or be referred to the Mpilo Hospital Oncology department for chemo-radiation.

VIAC based "Screen-and-Treat" cervical cancer prevention program fills the gap between outpatient treatment modalities and inpatient diagnostic/ therapeutic procedures for example conization and hysterectomy. As shown in Fig. 2, hysterectomies were offered to 12.7% of the VIAC positive patients, which is relatively low compared to other treatment modalities. This is advantageous as fewer unnecessary hysterectomies reduce the overall cost associated with hospitalization and fewer anaesthetic and surgical complications of major surgery.

Conclusion

The "See, Screen and Treat" approach has revolutionized cervical cancer screening and is assisting in the goal to eradicate cervical cancer. The approach has drastically reduced the time the client would need to spend in getting screened and the financial cost to the patient, making cervical cancer screening accessible to all. This study highlights the importance of VIAC as a viable cervical cancer screening method, especially in a low-resourced country. VIAC can significantly reduce the burden of cervical cancer as it is accessible and acceptable to patients. We recommend that more resources be mobilized and channelled towards increasing VIAC screening and treatment services throughout the country, to eradicate cervical cancer in Zimbabwe. There is a need to deliberately fund the training of pathologists/cytologists from certificates, diploma to degree levels to cater for government hospital laboratories, especially at tertiary hospitals.

Declarations

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Competing interests

All authors declare no competing interests.

Availability of data and materials

All data generated or analysed during this study are included in this published article and not publicly available because of ethical concerns regarding privacy and confidentiality. They are, however, available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Strict confidentiality was assured and ensured at all times when handling data during all processes of data collection, capturing, analysis and storage. Permission to conduct the study was obtained from United Bulawayo Hospitals ethics committee. The committee belongs to the United Bulawayo Hospitals.

Consent for publication

Not Applicable

Author Contributions

Taurai Gunguwo: Overall supervisor, critical review, editing and revision of manuscript; Martin Chandiposha: Researcher, data collection and analysis, main manuscript writing, drawing of tables and figures, critical revision and editing; Abigail Nobuhle Lupepe: Critical review, editing and revision of manuscript, drawing of tables and figures; Mpumelelo Sibanda: Editing and revision of manuscript. Harrison Rambanapasi: Critical revision and editing of manuscript. Blessing Govera: Data collection, storage and analysis and review of manuscript;

All authors have read and approved the manuscript.

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Figures

Figure 1

Prevalence of pre-cancerous cervical lesions among UBH VIAC clients.

Figure 2

Treatment Modalities Offered to Clients with Cervical Lesions