Early experiences in integrating cervical cancer screening and treatment into HIV services in Zomba Central Hospital, Malawi

Colin Pfaff1,2, Victor Singano1, Harriet Akello1, Alemayehu Amberbir4, Josh Berman1, Annex Kwekwas1, Alfred Matengeni1, Victor Banda1, Jack Msonko2, Colin Speight2, Biselele M Kabeya1, Joep J van Oosterhout4,5

1. Dignitas International, Zomba, Malawi
2. Department of Family Medicine, College of Medicine, University of Malawi, Blantyre, Malawi
3. Lighthouse Trust, Lilongwe, Malawi
4. Department of Obstetrics and Gynaecology, Zomba Central Hospital, Zomba, Malawi
5. Department of Medicine, College of Medicine, University of Malawi, Blantyre, Malawi

Abstract

Background
Malawi has the highest rate of cervical cancer globally and cervical cancer is six to eight times more common in women with HIV. HIV programmes provide an ideal setting to integrate cervical cancer screening.

Methods
Tisungane HIV clinic at Zomba Central Hospital has around 3,700 adult women receiving treatment. In October 2015, a model of integrated cervical cancer screening using visual inspection with acetic acid (VIA) was adopted. All women aged 20 and above in the HIV clinic were asked if they had cervical cancer screening in the past three years and, if not, were referred for screening. Screening was done daily by nurses in a room adjacent to the HIV clinic. Cold coagulation was used to treat pre-cancerous lesions. From October 2016, a modification to the HIV programme’s electronic medical record was developed that assisted in matching numbers of women sent for screening with daily screening capacity and alerted providers to women with pre-cancerous lesions who missed referrals or treatment.

Results
Between May 2016 and March 2017, cervical cancer screening was performed in 957 women from the HIV clinic. Of the 686 (71%) women who underwent first ever screening, 23 (3.4%) were found to have VIA positive lesions suggestive of pre-cancer, of whom 8 (35%) had a same-day cold coagulation procedure, seven (30%) deferred cold coagulation to a later date (of whom 4 came for treatment), and 8 (35%) were referred to surgery due to size of lesion; 5/686 (0.7%) women had lesions suspicious of cancer.

Conclusion
Incorporating cervical cancer screening into services at HIV clinics is feasible. A structured approach to screening in the HIV clinic was important.

Key words: HIV, cervical cancer, screening

Introduction
Malawi has the highest prevalence of cervical cancer in the world with an age standardized rate of 75.9 per 100,000.1 This accounts for 45% of all female cancers in Malawi and results in at least 1,600 deaths per year.2 Women with HIV have 6 to 8 times increased risk of cervical cancer.4,5,6 Cervical cancer is preventable with both Human Papilloma Virus (HPV) vaccination and regular screening and treatment of pre-cancerous lesions. HPV vaccination programmes have been implemented in several African countries and a pilot project has recently been concluded in Malawi with plans for national scale up by 2019.7 However, even when the vaccine is made available, millions of women will be beyond the priority age of vaccination and screening this population for cervical cancer will remain crucial.8 Several studies have shown that screening programmes using visual inspection of the cervix with acetic acid (VIA) are feasible and acceptable in resource limited settings.9,10,11,12 A study of VIA screening over 3 years in a general population of women in India demonstrated a 24% reduction in incidence of cervical cancer and a 35% reduction in cervical cancer mortality.13 VIA screening has been successfully integrated into HIV services in several countries. In Zambia, HIV infrastructure was used to offer cervical cancer screening on a national scale.14 In Cote d’Ivoire, cervical cancer screening was offered to all women attending HIV services at four clinics, by means of a mobile team of midwives.15 All women attending an urban HIV clinic in Botswana were offered VIA as part of the clinic’s services12 and in a large HIV clinic in Lilongwe, Malawi, hypertension and cervical cancer are also screened for and managed as part of routine anti-retroviral (ART) services.16 For women who screen positive for lesions suggestive of cervical cancer, several treatment options are available. Cryotherapy has been widely used in many African countries and is the main method used in Malawi.17 More recently cold coagulation has been introduced, which offers several potential advantages over cryotherapy.18 For locally invasive lesions confined to the cervix but considered too large for cryotherapy or cold coagulation, other options include loop electrical excision procedure (LEEP), cold-knife conization and hysterectomy.18 Cervical cancer screening programmes also detect patients with already advanced carcinoma, but treatment options for malignancies in many African countries remain limited due to lack of oncology expertise and radiotherapy services.19

© 2018 The College of Medicine and the Medical Association of Malawi. This work is licensed under the Creative Commons Attribution 4.0 International License. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

https://dx.doi.org/10.4314/mmj.v30i3.14
The Malawi Ministry of Health has adopted VIA as the method of screening for cervical cancer. When pre-cancerous lesions are detected, they should be treated with cryotherapy. VIA is available at most district hospitals, but cryotherapy is often unavailable due to broken machines or lack of gas. Although national HIV guidelines recommend that all HIV positive women receive VIA annually, this has not been widely implemented. Cervical cancer screening had been available for many years at Zomba Central Hospital, but the service had often been poorly staffed and under-equipped, with no structured system for referring HIV positive women for cervical cancer screening.

In October 2015, Dignitas International, a medical and research organization, together with the Malawi Ministry of Health, established cervical cancer screening at the HIV clinic at Zomba Central Hospital. This was part of a broader initiative to fully integrate HIV and non-communicable disease (NCD) care where all adults accessing care in the HIV clinic are screened and treated for hypertension, diabetes and cervical cancer. We describe the process and outcomes of the integration of HIV care with cervical cancer screening, including innovations used and challenges encountered.

**Methods**

**Setting**

Zomba District is one of the most densely populated districts in Malawi with 670,500 inhabitants at the time of this study. The HIV clinic at Zomba Central Hospital has over 6,500 patients in care, of whom around 3,700 are adult women 20 years and older. It has been supported by Dignitas International since 2004 in the provision of supplementary clinical, laboratory and counseling staff and technical assistance.

**Implementation of integrated cervical cancer screening at the HIV clinic**

As part of the NCD integration initiative, new equipment was purchased and new staff were trained. The broken existing cryotherapy machine was replaced with a cold coagulator. Experience elsewhere in Malawi had shown the difficulties in maintaining cryotherapy equipment and the relative robustness of cold coagulation equipment.

Cryotherapy uses carbon dioxide gas to freeze a metal probe which is then applied to the cervix. A systematic literature review of 32 articles has found cure rates of 98.5% for all grades of disease, including 12 monthly follow up using cryotherapy.

Cold coagulation involves using a metallic probe heated to 100-120 ℃ (relatively low temperatures compared to other devices causing coagulation) and leads to thermal destruction of cervical tissue. Advantages of cold coagulation equipment include its small size and thus portability, minimal use of electricity and shorter time of treatment compared to cryotherapy.

Cervical cancer screening was conducted in close adjacent to the HIV clinic. Screening was offered to all eligible women in HIV care by expert clients (ECs) who are patients on ART, who regularly attend an HIV clinic are far more accessible to health care workers than women in the community. Incorporating cervical cancer screening into HIV care is, therefore, a logical strategy to reduce cervical cancer morbidity and mortality with a high benefit to women who regularly attend an HIV clinic.

**Data collection**

Data were collected using the existing VIA register that was modified to enable capturing of those who attended the HIV clinic. After six months of implementation, several challenges became apparent: many women referred for VIA did not attend the screening clinic or undergo screening. In addition, some women with pre-cancerous lesions elected to defer treatment with cold coagulation but did not return for care. As a response to the above two challenges, a modification to the existing HIV programme, Electronic Medical Record (EMR), was developed to incorporate VIA. This modification reminds clinicians about when VIA is due, limits daily numbers of referrals to match capacity, asks clinicians to check if women went to VIA when referred and alerts clinicians to women who had a positive VIA but did not receive same-day treatment (see figure 1). This modification was implemented in October 2016.

**Figure 1: Screenshot of VIA modification to Electronic Medical Record**

Ethics approval was not sought for this study as it utilizes data that is routinely collected and anonymised. This data is used in routine reporting for monitoring of service delivery of a medical program. All data can be requested from the Ministry of Health through the corresponding author.

**Results**

We evaluated cervical cancer screening visits in 957 women who were referred from the HIV clinic between May 2016 and March 2017. Of the 686 (71%) women who underwent VIA screening, 73% (35%) had a same-day cold coagulation procedure, 7 (30%) deferred cold coagulation to a later date (of whom 4 came for treatment), and 8 (35%) were referred to surgery due to size/carcinoma in situ/bad lesions. Over three-quarters (79%) of women who were referred for VIA had a prior positive VIA test result. Of the 23 VIA positive women, 19 (82.6%) were within age group 31-45, 3 (13%) >45 years and only 1 (4.4%) <30 years. VIA positive women (N=23) were slightly older than all HIV -positive women (N=51), at 30.7±9.3 years. Comparing data from five months prior to the implementation of the modification of the EMR to six months after the intervention, the monthly average of women receiving VIA screening from the HIV clinic for the first time showed little change. However, the monthly percentage of women referred via EMR who were referred with VIA in less than 48 hours increased from 31% (n=15) to 38% (n=20).

**Discussion**

Before the implementation of the EMR modification, many women who were referred from the HIV clinic for cervical cancer screening were turned away from VIA services, they likely chose not to attend VIA screening due to long waiting lines. The cervical cancer screening program at Zomba Central Hospital modified to enable capturing of those who attended the VIA clinic. To improve healthcare service delivery, the use of cold coagulation as an alternative to cryotherapy has the potential to reduce logistical barriers to interruptions in equipment and supplies.

**Authors’ contributions**

The authors contributed as follows: JVO conceived the project, CBK and HA led the guideline development; JB participated in the design of the project review. AA, AM, JM and VB led design of the data analysis. CS assisted with program evaluation. JB led manuscript preparation. All authors contributed to and approved the final manuscript.

**Funding**

Funding for the NCD-HIV integration project was provided by Grand Challenges Canada and the United States Agency for International Development. Grand Challenges Canada funded the implementation of the project. The authors also declare no competing interests and the project contributed to and approved the final manuscript.

**Declaration of competing interests**

Authors declare no competing interests.
Dzwola T et al. Burden of cancer in Malawi: common types, incidence and trends: national population-based cancer registry. BMC Res Notes. 2012; 5: 149. doi: 10.1186/1756-0500-5-149

3. World Health Organization. Human Papillomavirus and Related Cancers: Malawi. Summary Report Update. Geneva: WHO; 2010. Available at: http://screening.iarc.fr/doc/Human%20Papillomavirus%20and%20Related%20Cancers.pdf Accessed on 31 January 2018

4. Clifford GM, Polesel J, Rickenbach M, Dal Maso L, Keiser O, Kohler A et al. Cancer risk in the Swiss HIV Cohort Study: associations with immunodeficiency, smoking, and highly active antiretroviral therapy. J Natl Cancer Inst. 2005; 97: 425-432. doi: 10.1093/jnci/dij072

5. Serraino D, Dal Maso L, La Vecchia C, Franceschi S. Invasive cervical cancer as an AIDS-defining illness in Europe. AIDS 2002; 16: 781-786.

6. Frisch M, Biggar RJ, Goedert JJ. Human papillomavirus-associated cancers in patients with human immunodeficiency virus infection and acquired immunodeficiency syndrome. J Natl Cancer Inst. 2000; 92: 1500-1510.

7. Msyamboza KP, Mwagomba BM, Valle M, Chiuma H, Phiri T. Implementation of a human papilloma virus demonstration project in Malawi: successes and challenges. BMC Public Health 2017; 17:599. doi:10.1186/s12889-017-4526-y.

8. Tsu DV, Ginsburg O. The investment case for cervical cancer elimination. Int J Gynecol Obstet. 2017: 138 (Suppl 1): 69-73. doi: 10.1002/igo.12193

9. Sankaranarayanan R, Rajkumar R, Esmy PO, Fayette JM, Shanthakumary S, Frappart L et al. Effectiveness, safety and acceptability of ‘see and treat’ with cryotherapy by nurses in a cervical screening study in India. Br J Cancer 2007; 96: 738-743. doi: 10.1038/sj.bc.6606363

10. Denny L, Kuhn L, De Souza M, Pollack AE, Dupree W, Wright TC, Jr. Screen-and-treat approaches for cervical cancer prevention in low-resource settings: a randomized controlled trial. JAMA 2005; 294: 2173-2181. doi: 10.1001/jama.294.17.2173

11. Blumenthal PD, Gaffikin L, Deganus S, Lewis R, Emerson M, Adedove S et al. Cervical cancer prevention: safety, acceptability, and feasibility of a single-visit approach in Accra, Ghana. Am J Obstet Gynecol. 2007; 196: 407 e401-408. doi: 10.1016/j.ajog.2006.12.031

12. Ramogola-Masire D, de Klerk R, Monare B, Ratshaa B, Friedman TC, Jr. Screen-and-treat approaches for cervical cancer prevention in rural Malawi. Int J Cancer 2016; 139: 908-15. doi: 10.1002/ijg.30101

13. Parham GP, Mwanahamuntu MH, Kapambwe S, Muwonge R, Bateman AC, Blevins M, et al. Population-Level Scale-Up of Cervical Cancer Prevention Services in a Low-Resource Setting: Development, Implementation, and Evaluation of the Cervical Cancer Prevention Program in Zambia. PLoS ONE 2015; 10(4): e0122169. doi:10.1371/journal.pone.0122169.

14. Parham GP, Mwanahamuntu MH, Safasrabuddhe VK Westfall A, King KE, Chibwesha C et al. Implementation of cervical cancer prevention services for HIV-infected women in Zambia: measuring program effectiveness. HIV Ther. 2010; 4: 703-722. doi:10.2217/hiv.10.52

15. Parham GP, Mwanahamuntu MH, Safasrabuddhe VK Westfall A, King KE, Chibwesha C et al. An integrated cervical cancer screening and HIV testing intervention model for HIV-infected women in Zambia: measuring program effectiveness. HIV Ther. 2015; 10(3): 703–722. doi:10.2217/hiv.15.45

16. Correa P, Hripcsak G, Mohr D, Cleary P, Taylor J et al. Cancer screening uptake and challenges in Malawi from 2011 to 2015: retrospective cohort study. BMJ Public Health 2016; 16: 806. doi:10.1136/bmjstol-2016-205153

17. Castle EP, Murokora D, Perez C, Alvarez M, Quek SC, Campbell C. Treatment of cervical intraepithelial lesions. Int J Gynaecol Obstet. 2017; 138 (Suppl 1): 20-25. doi: 10.1002/igo.12191

18. Msyamboza KP, Mwagomba BM, Valle M, Chiuma H, Phiri T. Implementation of cervical cancer screening by visual inspection in Cote d’Ivoire, January 2018

19. Kington TP, Alatise OI, Vanderpuye V, Casper C, Abantanga FA, Kamara TB, et al. Treatment of cancer in sub-Saharan Africa. Lancet Oncol. 2013; 14(4): 158–67. doi: 10.1016/S1470-2045(12)70472-2

20. Masefo KC, Chirwa ML, Muula AS. Health systems challenges in cervical cancer prevention program in Malawi. Glob Health Action. 2015; doi:10.3402/gha.v8.26282.

21. Malawi Ministry of Health. Clinical Management of HIV in adults and children. Lilongwe: Ministry of Health; 2016.

22. Pfaff C, Singano V, Akello H, Amberbir A, Garone D, Berman J et al. Early experiences of integrating non-communicable disease screening and treatment in a large ART clinic in Zomba Malawi. Poster presented at: XXI International AIDS Conference (AIDS 2016). 2016; 18-22 July; Durban, South Africa.

23. Campbell C, Kafwawira S, Brown H Walker G, Madetsa B, Deeny M et al. Use of thermo-coagulation as an alternative treatment modality in a 'screen-and-treat' programme of cervical screening in rural Malawi. Int J Cancer 2016; 139: 908-15. doi: 10.1002/ijg.30101

24. Castro W, Gage J, Gaffikin L, Ferreccio C, Sellors J, Sherri S et al. Cervical cancer prevention issues in depth I. Effectiveness and acceptability of cryotherapy: a systematic literature review. Analysis for cervical cancer prevention: 2003. Available at http://www.path.org/publications/files/RH_cryo_white_paper.pdf. Accessed on 31 January 2018

25. World Health Organisation. WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention. Geneva: WHO; 2013. Available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwi6pI0xn4LZAhXChSHQHuolAQFggjMAAurl=http%3A%2F%2Fapps.who.int%2Firis%2Fbitstream%2F10665%2F94830%2F1%2F9789241548694.pdf&usg=AFQjCgWmV3mjr94rUDWFxTwAYm-tVo. Accessed on 31 January 2018

26. Parham GP, Mwanahamuntu MH, Kapambwe S, Muwonge R, Bateman AC, Blevins M, et al. Population-Level Scale-Up of Cervical Cancer Prevention Services in a Low-Resource Setting: Development, Implementation, and Evaluation of the Cervical Cancer Prevention Program in Zambia. PLoS ONE 2015; 10(4): e0122169. doi:10.1371/journal.pone.0122169.

27. Parham GP, Mwanahamuntu MH, Sahasrabuddhe VK Westfall A, King KE, Chibwesha C et al. Implementation of cervical cancer prevention services for HIV infected women in Zambia: measuring program effectiveness. HIV Ther. 2010; 4(6): 703–722. doi:10.2217/hiv.10.52

28. PATH. Treatment Technologies for Precancerous Cervical Lesions in Low-Resource Settings: Review and Evaluation. 2013. [cited 2015 November 27]. Available at: http://www.rho.org/HPV-screening-treatment.htm. Accessed on 31 January 2018

29. Singh P, Loke K, Hii JHC, Sabaratnam A, Lim-Tan SK, Sen, DK et al. Cold Coagulation Versus Cryotherapy for Treatment of Cervical Intraepithelial Neoplasia: Results of a Prospective Randomized Trial. Journal of Gynecologic Surgery 1988; 4: 211-221. doi:10.1089/gyn.1988.4.211

30. Dolman L, Sauvaget C, Muwonge R, Sankaranarayanan R. Meta-analysis of the efficacy of cold coagulation as a treatment method for cervical intraepithelial neoplasia: a systematic review. British J Obstet Gynecol. 2014; 121: 929–942. doi: 10.1111/jo-0147-0528.12655