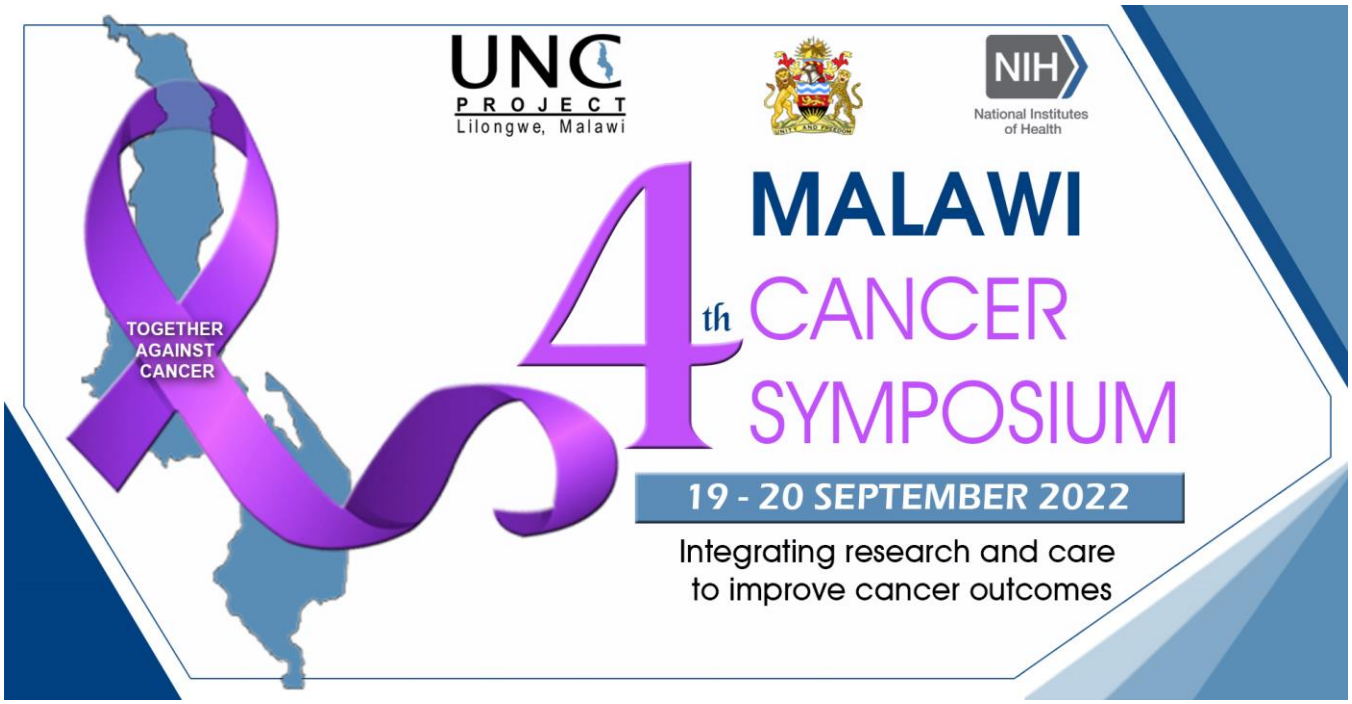

Welcome to the fourth annual

MALAWI CANCER SYMPOSIUM

September 19th – September 20th, 2022

Ufulu Gardens Hotel

Lilongwe, Malawi

Welcome to the fourth annual Malawi Cancer Symposium!

The symposium is organized by the UNC Project Malawi Cancer Program and the Lineberger Comprehensive Cancer Center in collaboration with the Malawi Ministry of Health. Key stakeholders have been invited to present on issues related to cancer strategy, care, advocacy and research in Malawi. The symposium will provide a platform for both local and international cancer research, care and advocacy stakeholders to exchange information, highlight strategic priorities and identify opportunities for collaboration, personal development, and training with the common goal of reducing the burden of cancer in Malawi.

Cancer is a rapidly emerging problem in resource-limited settings including Malawi. The UNC Project Malawi Cancer Program hopes to help catalyze a coordinated national effort to address this growing problem.

Moving forward, it is hoped that the Malawi Cancer Symposium will continue to be held annually and in collaboration with other key stakeholders, to promote ongoing collaborative efforts to reduce cancer burden within the country.

For more information about the UNC Project Malawi Cancer Program, visit our website at https://globalhealth.unc.edu/malawi/cancerprogram/.

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Dr Beatrice Matanje, Partners in Health
Dr Bongani Kaimila, UNC Project Malawi
Dr Tamiwe Tomoka, UNC Project Malawi
Dr Yuri Fedoriw, UNC Chapel Hill
Dr Mwansambo, Malawi Ministry of Health
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Dr Neema Rusibamayila Kimambo, WHO
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Dr Jonathan Ngoma, Kamuzu Central Hospital
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Dr. Nmazuo Ozuah, Global Hope
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Dr Chimwemwe Banda, Kamuzu Central Hospital
Dr Leo Masamba, Queen Elizabeth Central Hospital
Dr Precious Makondi, Kamuzu Central Hospital
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Dr Jacqueline Huwa, Lighthouse Trust
Dr Natasha Ngwira, Kamuzu Central Hospital
Dr Agatha Bulla, UNC Project Malawi
Dr Matt Painschab, UNC Project Malawi
Dr Benjamin Kumwenda, Kamuzu University of Health Sciences

Abstracts

Treatment with ART impacts survival of HIV-associated DLBCL: an update from the Kamuzu Central Hospital Lymphoma Study. Coelho J, Puranam K, Roush S, Newsome P, Tomoka T, Gopal S, Painschab M, Fedoriw Y. *(Selected for oral presentation)*

Introduction: Diffuse Large B-cell Lymphoma (DLBCL) is the most common lymphoma subtype among both HIV-positive (HIV+) and HIV-negative (HIV-) individuals, though the conditions under which lymphomagenesis occurs differ greatly. Additionally, treatment with anti-retroviral therapy (ART) further impacts immune pressures and the resulting tumor microenvironment. We previously showed no associations with outcome or cell-of-origin (COO) when stratified by HIV status, but demonstrated molecular difference in the tumor microenvironment of HIV-associated DLBCL. We hypothesized further stratifying by ART duration prior to DLBCL diagnosis in a larger set of patients would reveal differences in outcome, DLBCL morphology and COO.
Methods: The Kamuzu Central Hospital (KCH) Lymphoma Study has prospectively enrolled patients with newly diagnosed lymphomas in Malawi since 2013 who receive standardized treatment and follow-up. All patients were treated with conventional CHOP chemotherapy, and a subset also received Rituximab. Diagnostic, pre-treatment tissue biopsies were evaluated at KCH aided by conventional immunohistochemistry (IHC), after which formalin-fixed paraffin-embedded (FFPE) tissue blocks were submitted to UNC for further IHC and analysis. Epstein-Barr virus (EBV) status was determined by EBER-ISH and EBV-positive cases were excluded
91 FFPE tissue blocks were available for study, including 23 HIV+/ART-naïve, 36 HIV+/ART-experienced, and 32 HIV- cases after EBV exclusion. HIV+/ART-experienced cases are defined as patients who had been taking antiretroviral medication for 6 months or more at the time of diagnosis. COO was determined using the Hans algorithm. Morphology was determined by a pathologist via H&E staining as either centroblastic or immunoblastic. All statistical analyses were performed in R Studio, version 2022.02.0.
Results: There was no relationship between morphology (p=0.444) or COO (p=0.316) with ART status by Pearson's chi-squared additionally, no significant differences were observed in overall survival (OS) or event-free survival (EFS) by either morphology (p=>0.9, p=0.71) or COO (p =0.11, p=0.5). However, HIV+/ART naïve DLBCL cases were more commonly germinal center (GC), at 82.6% of cases having GC origin. Both HIV+/ART-experienced and HIV- cases trended towards decreased OS (HR=1.80, p=0.13 and HR=1.96, p=0.086 respectively). Further, HIV+/ART-experienced had significantly decreased EFS (HR=4.30, p=0.024), but HIV- EFS was not significantly different compared to HIV+/ART-naïve (HR=2.12, p=0.3).
Conclusions: HIV+ DLBCL stratified by ART status did not show differences in histologic subtype or COO. As we have previously shown, COO did not associate with OS in the entire cohort by HIV/ART status. Morphology also did not associate with OS. However, ART-status associates with both OS and EFS, with HIV+/ART-naïve cases having the most positive outcomes.
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Translation and validation of the Chichewa pediatric patient-reported-outcome-CTCAE tool to measure treatment-related adverse events among adolescent and young adult lymphoma patients in Malawi.

Evans A, Tilly AE, Gondwe Y, Chikasema M, Manda A, Reeve BB, Westmoreland KD. *(Selected for oral presentation)*

Introduction: Internationally, patient-reported outcome (PRO) tools to assess health-related quality of life (HRQoL) and adverse events (AE) are available, but efforts to translate and culturally validate such tools in sub-Saharan Africa (SSA) are limited.
Methods: The Pediatric PRO version of the Common Terminology Criteria for Adverse Events (Ped-PRO-CTCAE) includes a core 15 AE symptoms. Each symptom has 2-3 questions, a 4-point Likert-type scale, and a 7-day recall period. The Ped-PRO-CTCAE was translated into Chichewa and culturally validated for use in Malawi using the FACIT

method. Psychometric validation was assessed using Spearman's correlation for convergent and discriminant validity, Wilcoxon rank-sum for known group validity, and T-test for responsiveness.
Results: Fifty-Two adolescent and young adult (AYA) patients with lymphoma completed the Ped-PRO-CTCAE survey. When compared to the translated and validated Patient-Reported Outcomes Measurement Information System (PROMIS) Pediatric tool, there were stronger correlations when symptoms matched (ie pain interference r=0.57, fatigue r=0.73, depression r=0.62, and anxiety r=0.75). Known group validity testing showed that patients with poor performance status (ECOG≥2) had higher pain frequency ($p<0.001$) and pain prevalence ($p=0.005$); and patients with anemia (hgb<9g/dL) had worse fatigue severity ($p<0.001$). Ped-PRO-CTCAE when compared to home symptom diary (ie nausea, constipation, pain, mucositis, insomnia and abdominal pain) were correlated across all matching PRO-CTCAE domains ($p<0.001$). Responsiveness was supported when comparing Ped-PRO-CTCAE scores at T0 and T1 (+5 to < 21 days from T0); T1 exhibited higher mean scores associated with expected worse symptoms after chemotherapy across all fifteen PRO-CTCAE symptom AEs ($p<0.001$).
Conclusions: This study found supporting evidence for the validity of the Chichewa-translated version of the Ped-PRO-CTCAE for Malawi. This emphasizes an urgent need to address symptomatic AEs experienced by children and AYA undergoing cancer treatment in SSA using PRO instruments validated within the local context.
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Applying Implementation Science Frameworks to Identify Patient and Provider Barriers and Facilitators to Curative-Intent Breast Cancer Treatment at Kamuzu Central Hospital in Malawi. Morgan J, Tseka J, Bula A, Simwinga L, Elmore S, Tomoka T. (*Selected for oral presentation*)

Introduction: Multimodality curative-intent breast cancer treatment according to resource-stratified guidelines is becoming increasingly available in sub-Saharan Africa however rates of treatment completion remain suboptimal at Malawi's Kamuzu Central Hospital (KCH) and in the region. We conducted a multilevel assessment of the breast cancer treatment system to identify barriers and facilitators to curative-intent treatment completion.
Methods: We utilized a prospective cohort of newly diagnosed breast cancer patients at KCH from December 2016-present. Eligible patients included those age≥ 18 who currently or previously having received curative-intent breast cancer treatment; and eligible providers included those age ≥18 who currently or recently provided breast cancer care at KCH. Semi-structured interviews were conducted among eligible participants in Chichewa or English. Interview guides were developed using two implementation science frameworks: the Theoretical Domains Framework (TDF) and Consolidated Framework for Implementation Research (CFIR) to elicit themes at an individual level and system level, respectively. A coding manual based on these frameworks directed coding by two independent study personnel. Thematic content analysis was used to identify themes within TDF and CFIR domains. Strength and valence of themes were determined to be high, medium, or low by coding study personnel. Comparisons were made by HIV status of patients.
Results: Thirty patients and eight providers were enrolled. Treatment-related travel costs and poor nutritional and psychosocial support were identified as barriers to treatment completion across multiple domains among both patients and providers with high strength and valence. Patients and providers identified complementary potential facilitators of treatment completion with patients reporting ongoing educational and supportive care talks and providers reporting increased specialized staffing and time/training for patient counseling. Treatment as the only way to continue to live (high strength and valence) was identified as a facilitator of treatment completion among patients because as one participant said, "cancer is death." Conversely, providers emphasized that improving symptoms and quality of life facilitated treatment completion. Regarding structural characteristics (CFIR domain), patients and providers identified surgical delays/ limited surgical staffing, drug stock outs and long wait times for labs and appointments as barriers to completing treatment (all with high strength and valence). Providers identified isolated clinical teams and limited specialized training among providers as barriers to treatment completion whereas standardized treatment plans served as facilitators. Across numerous domains, both HIV positive and negative patients identified social isolation during treatment as a barrier and attributed this to breast cancer being viewed as a "death sentence" or "contagious" or leading to disfigurement however this theme was

not identified by providers. HIV positive patients reported that juggling HIV and cancer care was a barrier yet being in HIV care may have facilitated easier diagnosis and treatment.
Conclusion: Barriers and facilitators identified in this study can serve to inform targeted interventions to improve breast cancer treatment completion at KCH. Interventions which target 1) cancer stigma for the general population 2) travel cost, nutritional needs, and psychosocial support for patients and 3) coordinated multidisciplinary care among providers could lead to improved outcomes for patients.
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Integration of cervical cancer screening and treatment of pre-cancerous lesion in 16 Lighthouse supported HIV clinics between July 2021 and June 2022. Chiwoko J, Thawani A, Viola E, Millongo P, Msiska M, Kachere LG. *(Selected for oral presentation)*

Introduction: Malawi has the world's highest incidence and mortality rates of cervical cancer (CaCx) with 51.5 deaths/100,000/year. Women living with HIV (WLHIV) have six-fold increased risk of developing CaCx. Early detection through screening helps to avoid CaCx and reduce complications. Malawi National CaCx screening target is at 80%, however Malawi is far below achieving it. Lighthouse started implementing CaCx screening and treatment of precancerous lesion among WLHIV in 2012 and scaled up to 16 facilities in October 2018. We describe Lighthouse's experience and successes in integrating cervical cancer screening services and treatment of pre-cancerous lesion in HIV Clinics.
Methods: The CxCa screening program was implemented in 16 health facilities (HFs) in 7 districts across Malawi, namely Lilongwe, Blantyre, Zomba, Ntchisi, Nkhatabay, Rumphi, and Mzimba. The Scaled-up program has been implemented from October 2018 to date, and targeted to reach over 80% WLHIV aged 25 to 49 years. Lighthouse provided equipment and supplies, trained and mentored providers. Visual inspection of the cervix using acetic acid (VIA) was done to women above 15years old. Routine data was collected using national data collection tools and descriptive data analysis was conducted.
Results: During the period of July 2021 to June 2022, 30,823 WLHIV were screened for CaCx using VIA, of which 939 (3%) were positive for precancerous lesions. Among these, 538 (57%) were eligible for ablation and were all treated using Themo-coagulation (97% same day treatment). Among VIA positive clients, 369 (39%) had lesions >75%, and 154 CaCx suspects were referred for further management. 11216 (36%) were screened for the first time with positivity rate of 4%, 19192 (62%) subsequent screening with positivity rate of 3% and 415 (1%) post treatment screening with positivity rate of 9%. Positivity rate was the same (3%) in all age groups except 50+ (2%). Under treatment by unexperienced providers contributed to higher positivity rate among women screened post-treatment.

Table 1: number of women screened per age group, from July 2021 to June 2022 in 16 Lighthouse supported facilities

	15-19 years *N (%)*	*20-24years* *N (%)*	*25-49years* *N (%)*	*50 years+* *N (%)*
Number Screened	252	1,471	26,325	2,775
Screened Positive	7 (3)	50 (3)	833 (3)	49 (2)
Suspected Cancer	0	4 (0.3)	126 (0.5)	24 (0.9)
Eligible for Ablation	5 (71.4)	35 (70)	476 (57.1)	24 (49)
Treated using thermocoagulation	5 (100)	35 (100)	472 (99.2)	24 (100)
Same day treatment	5 (100)	35 (100)	456 (96.6)	24 (100)

Conclusion: Cervical cancer screening was successfully integrated into HIV programming in 16 health facilities on a large scale. This intervention indicates that screening and same-day treatment of precancerous lesion is feasible and can help to reduce CxCa morbidity and mortality among WLHIV.
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Identification of genetic variants associated with cervical cancer in Malawian women. Gwayi SD, Tomoka T, Chinula L, Chimusa ER, Fedoriw Y, Kumwenda B. (*Selected for oral presentation*)

Introduction: Cervical cancer is one of the most common causes of death among women globally, with over 500,000 cases and 300,000 deaths in 2018. In 2021, the global cervical cancer mortality rate was estimated at 7.3 deaths per 100,000 women per year, while in Malawi the mortality rate was estimated at 51.5 deaths per 100,000 women per year. Cervical cancer prevalence is largely attributed to Human Papilloma Viruses (HPV) as causative agent; however, studies have shown that genetic factors influence the disease. Genetic variants and Single Nucleotide Polymorphisms (SNPs) have been identified in different genes including SHKBP1, ERBB3, CASP8, HLA-A and TGFBR2 associated with the disease. These genetic variants and SNPs vary among different populations and certain variants are specific to a particular population. However, in Malawi, despite the high rate of cervical cancer cases, the genetic variants that predispose women to the disease and are unique to the Malawian population have not been investigated. Hence, the aim of this study is to identify genetic features associated with cervical cancer that are unique to Malawi women and could help in efficiently screening the disease.
Method: This is a case control study comprising 100 Malawian cases obtained at University of North Carolina Lilongwe project (UNC-Lilongwe) and the 1000 public genomes as control. Whole genome sequencing will be done using NextSeq1000 Illumina platform. SNPs and variants will be identified using Genome Analysis Toolkit (GATK). Variants annotation and enrichment analysis will be done using the **D**atabase for **A**nnotation, **V**isualization and **I**ntegrated **D**iscovery (DAVID) and Gene network visualization and enrichment analysis tools. To identify SNPs associated with cervical cancer, a burden association test will be done using Test for Rare Variants Against Public Database (TRAPD) and Genome Wide Association (GWAS) techniques. A meta-analysis will be done using output statistics from other cervical cancer GWAS results. Protein structures with identified SNPs associated with the disease will be modelled to determine the structural and functional impact. Finally, an integrative polygenic risk scores (PRS) calculation will be conducted which will enable risk stratification through identification of SNPs unique to Malawian women.
Expected Results: This study will effectively identify unique variants and SNPs associated with cervical cancer in Malawian women. It will reveal the impact of each significant variant or SNP on protein structure and consequently function. This will form a catalogue of SNPs that will form a basis for a genetic based cervical cancer screening among Malawian women.
Conclusion: The high number of cases of cervical cancer in Malawi demands for more robust and cost-effective techniques of screening, diagnosis and management of the disease. Thus, this study will facilitate the development of genetic based approach to cervical cancer screening, diagnosis and management, which are robust and efficient in combating the disease.
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Descriptive epidemiology of Kaposi Sarcoma in Malawi. Kudowa E, Moorad R, Gondwe Y, Gumulira J, Kasonkanji E, Painschab M, Dittmer D *(Selected for oral presentation)*

Introduction: Kaposi Sarcoma (KS) remains the most prevalent AIDS associated cancer globally. The high burden of HIV/AIDS in Sub Saharan Africa has largely contributed to the rise in KS cases in the region. However, there is not much information on the descriptive epidemiology of KS patients in Malawi. We sought to perform a

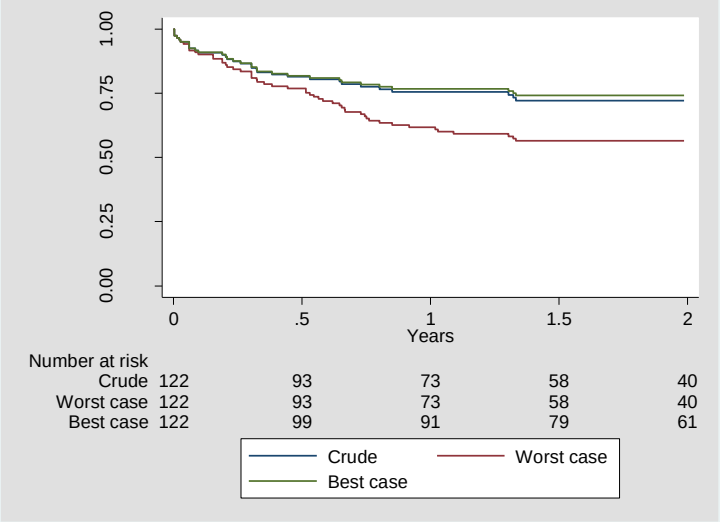
descriptive analysis on KS baseline characteristics and clinical outcomes under routine treatment at an HIV clinic in Malawi.

Methods: This was a prospective, observational study of KS patients enrolled at Lighthouse Clinic (LH), a Centre of excellence in HIV management at Kamuzu Central Hospital in Lilongwe, Malawi. Adult patients initiating treatment for newly diagnosed, pathologically confirmed HIV-associated KS were enrolled between February 2017 and June 2019. We used descriptive statistics to summarize patients' demographic characteristics and treatment outcomes. Kaplan Meir curves were used to estimate patient's survival. Sensitivity analysis using worst and best-case scenarios were used to account for the effect of loss to follow-up on our survival estimates. With the worst-case scenario, we assumed that every loss to follow-up patient had died, whereas for best-case scenario we assumed loss to follow-up to be alive.

Results: There were 122 KS patients in this study. Median age 36 years (IQR; 32, 44). The median CD4 count was 197 (IQR: 96-337), median HIV viral load (VL) was 2.6 (IQR; 1.6, 4.7) where 58% had VL < 1000 copies, and 50% started ART prior to KS diagnosis. There were 85% patients with T1 disease and 56% of the patients with T0 disease were already on ART > 3 months prior to KS treatment. The median number of treatment cycles received was 16(IQR; 6, 7) and 54% of the patients had received more than 15 treatment cycles. Of the 33(33%) deaths, both KS and treatment related deaths were 12(36%). The mean follow-up time was 1.4 years (SD; 1.0) and 21 (17%) were lost to follow-up. The 2-year overall and progression free survival were 72% and 56%, respectively. For the best-case scenario, the 2-year overall survival was 74% while the worst-case scenario was 56% Figure 1.

Conclusions: Early initiation of ART accompanied by access to chemotherapy contributed to relatively high survival after KS treatment in an HIV clinic in Malawi. In this observational cohort, loss to follow-up may affect accurate estimation of survival as most patients who are lost to follow-up may have died. In order to limit loss to follow up, active patient tracing should be implemented and studies are needed to safely expand access to KS care closer to where patients live.

Figure 1: Overall survival, best-case and worst scenario for KS patients at Lighthouse Trust



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Castleman disease a diagnostic dilemma: a case series of seven patients seen at a tertiary health facility in Zambia. Mukonde F, Musonda F, Liusha N, Painschab M. *(Selected for oral presentation)*

Introduction: Castleman disease (CD) is a heterogeneous group of lymphoproliferative disorders of uncertain cause presenting with lymphadenopathy. There are three generally described immunological disorders of CD that occur in individuals of all ages and share a similar microscopic lymph node appearance but different

immunohistochemical profile. Oftentimes, diagnosis can be challenging where histology is not done, with most patients being presumptively treated as tuberculous (TB) adenitis.
Method: A total of seven cases of CD were documented between June 2020 and June 2022. All seven patients presented with fever, recurrent anemia and generalized lymphadenopathy. Whole body CT scans as well as excisional lymph node biopsies for histopathology and immunohistochemical staining for Human Herpes Virus-8 (HHV-8) were done on all seven patients.
Results: The median age was 42 years (range 20-54). There was one patient diagnosed with idiopathic Multicentric Castleman disease (iMCD) with Thrombocytopenia, Ascites, myeloFibrosis, Renal dysfunction and Organomegaly (TAFRO) syndrome in the course of the illness and the other six patients had KSHV-multicentric Castleman disease (KSHV-MCD). Of the 6 cases of KSHV-MCD, 3 were female and 3 were male. 5 were HIV positive and 1 was HIV negative. The hemoglobin range was 4.0-7.8 g/dl and all had albumin levels less 3g/dl. One patient had co-infection with TB meningitis, neurosyphilis and hepatitis B. One patient had cervical pre-cancer (CIN III) and a euthyroid goiter. Four patients were previously treated for TB on clinical grounds. One patient is in remission after having received six cycles of cyclophosphamide, vincristine and prednisolone two years ago. One patient has had two cycles of rituxmab, doxorubicin and prednisolone. One patient declined treatment and two died pending referral to the Cancer Diseases Hospital.
Conclusion: Most cases of CD likely go undiagnosed or misdiagnosed for other common causes of lymphadenopathy in Zambia. These are the first case reports in our hospital, with notable backgrounds of physicians having suggested TB treatment from the referring facilities. Both HHV-8 and non-HHV-8 associated CD may be quite common in our population, especially given the high rate of KS and KSHV in our setting, and there is need for prompt biopsy, reporting and treatment of all patients presenting with lymphadenopathy in our hospitals.
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Cancer-Associated Malnutrition, Cachexia, and Dietary Intake of Adult Out-patients Undergoing Chemotherapy at the National Cancer Center in Malawi. Dannayo C, Chikakuda A, Nyasosela R, Mpwanthe G *(Selected for oral presentation)*

Introduction: Cancer-related malnutrition and cachexia are complex phenomena with an estimated prevalence of up to 80% globally. Cancer-treatment side effects, such as reduced food intake, as indicated by over 68% of patients with cancer, aggravate the risk of malnutrition. Moreover, malnourished patients with cancer are two-to-five times more likely to die or not tolerate anticancer treatment. Early nutrition screening and assessment for malnutrition for appropriate dietetic/nutrition interventions are often overlooked in cancer services in Malawi, missing out on patients in need of nutrition support. As such, there is a dearth of data on cancer-related malnutrition, cachexia, and dietary intake to benchmark the severity of the problem in Malawi. Therefore, this study elucidated factors associated with cancer-related malnutrition, cachexia, and dietary intake among adult outpatients with cancer on chemotherapy to inform dietetic/nutrition interventions for cancer management.
Methods: We conducted a hospital-based cross-sectional study (protocol # 21/06/2728) among 114 adult outpatients receiving chemotherapy at the National Cancer Center in Malawi. Malnutrition Screening Tool screened for participant's risk of malnutrition and assessed for malnutrition and cachexia using the Global Leadership Initiative on Malnutrition and Fearon criteria, respectively. Each participant provided blood samples for analysis of inflammatory biomarkers such as c-reactive protein (CRP) and albumin. Dietary intake was assessed using the multiple pass 24-hour recall and semi-quantitative food frequency questionnaire. Data were then analyzed using IBM SPSS statistics version 26.0. Descriptive statistics such as percentages and frequencies described the characteristics of the participants. The adjusted multivariate logistic and multiple linear regression analyses determined the factors associated with malnutrition and cachexia, and dietary intake respectively.
Results: Of the 114 participants, 62.3% were females, with an overall mean age of 47.1 ± 14.3 years. Cervical (41.2%) and gastroesophageal (17.5%) were the more prevalent cancers. Over 45.6% of the participants were at risk of malnutrition; 27.2% presented with malnutrition, and 21.9% with cachexia. About 45.6% and 23.7% of the

participants had hypoalbuminemia, and high CRP levels, respectively. The participants' estimated mean energy intake (1642.5 ± 569.2 Kcal) was not significantly different from the standard energy requirements per kg per day (1745.6 ± 380.5 Kcal). The diet of participants significantly ($p<0.05$) provided lower macronutrients (protein, carbohydrate, and fat) compared to the standard reference. Only 13.2% and 22.8% of participants consumed fruits and vegetables daily. The risk of being malnourished significantly ($p<0.05$) increased with gastroesophageal cancer, poor handgrip strength, and high CRP. Similarly, the odds of cachexia increased significantly with gastroesophageal cancer, anorexia, and nutritional risk. Energy and protein intake were negatively associated with gastroesophageal cancer and less or equal to primary education status.
Conclusions: Even though unprioritized and underrecognized, malnutrition, cachexia, and poor dietary intake are prevalent among adult outpatients undergoing chemotherapy in Malawi. Cancer type (gastroesophageal) is a significant factor associated with malnutrition, cachexia, and dietary intake. Hence, there is a need to integrate early screening and assessment of malnutrition into clinical oncology for timely and appropriate dietetic/nutrition interventions to facilitate optimal care and improve patients' nutritional status.
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Etiology and outcomes of neutropenic fever at Kamuzu Central Hospital. Kasonkanji E, Tegha G, Purunam K, Kaimila B, Chikasema M, Konde D, Chawinga M, Fedoriw Y, Painschab M. *(Selected for oral presentation)*

Introduction: Cancer is one of the leading causes of morbidity and mortality in sub-Saharan Africa. Neutropenic fever (NF) is associated with significant morbidity and mortality for patients receiving chemotherapy. NF is a single oral temperature of ≥38.3º or ≥38.0 Celsius sustained for >1hour in a patient with neutropenia. To our knowledge, there is limited data regarding etiologic agents, bacterial species, and antimicrobial resistance patterns in NF patients in SSA. In this prospective cohort study, we sought to understand the frequency of neutropenic fever, etiology and clinical outcomes in participants receiving chemotherapy.
Methods: This single-center prospective, longitudinal cohort study enrolled participants >18 years between Jan 2019-Nov 2021 at Kamuzu Central Hospital (KCH). Eligible patients were those initiating new chemotherapy for either hematologic malignancy or HIV-infected patients with any malignancy. At enrolment we provided thermometers, fever charts and fever education to participants, who were oriented to self-check and record their daily oral temperature. Once a participant recorded a temperature >38 degrees Celsius, the participant immediately reported to clinic. At the clinic, we thoroughly assessed and evaluated participants using a standardized NF protocol. For each NF event, patients underwent systematic evaluation including; two blood cultures, complete blood count, urinalysis, malaria rapid detection test, and, when indicated, chest x-ray. According to the SOP, participants were treated with ceftriaxone, but clinician's discretion was allowed to tailor antibiotics per clinical scenario.
Results: We screened a total of 106 participants and enrolled 50; the primary reason for screen failure was distance to the hospital. 26 (52%) were males with a median age of 44 years and 26 (52%) had HIV infection. Those who had HIV infection had been on ART for at least six and a half years. Eighteen (36%) participants had aggressive lymphomas, eleven (22%) had Hodgkin lymphoma, three (6%) had multicentric Castleman disease (MCD), five (10%) had low-grade lymphoma, two (4%) had non-Hodgkin lymphoma, NOS, three (6%) had breast cancer, two (4%) had cervical cancer, while six (12%) had other solid tumors. 23 febrile events were recorded from 15 patients. 10 of the participants were HIV-ve while 5 were HIV +ve. Most patients who reported fever events had lymphoma diagnoses. Thirteen out of 23(56%) had positive isolates. We isolated the following infectious agents: Escherichia coli (6 events), Plasmodium falciparum (3 events), Streptococcus pneumoniae (2 events), Pseudomonas aeruginosa (1 event), and Citrobacter freundii (1 event). Of the gram-negative bacteria, 100% were resistant to fluoroquinolones, 100% resistant to Bactrim, 33% resistant to cephalosporins, and 66% resistant to aminoglycosides. One participant, with Pseudomonas bacteremia, died of their infection; all other survived to the end of their study follow-up period.

Conclusion: NF in cancer patients is a medical emergency with high mortality if not promptly treated. In this study, we demonstrated that neutropenic fever is common and can be successfully treated with a standardized protocol. Like in other studies antibiotic resistance was common in our study, however there's need to understand the best antibiotic regimen tailored to the local antibiogram. As a small, single-center study, this data needs validation at other centers and a larger patient population.
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National response to mitigating cervical cancer burden in Malawi: Malawi Ministry of Health. Chinula L, Kachingwe J, Phiri T, Jenda T, Sambani C, Chisema M, Chiwanda J, Phiri H, Kachale F, Parham G. *(Selected for oral presentation)*

Introduction: Malawi has the world's highest cervical cancer incidence and mortality rates, 67.9 and 51.5 per 100,000, respectively. Cervical cancer is the leading cause of cancer-related deaths and accounted for 37% of all new cancer cases among females in 2020. Globally, Malawi has one of the highest adult HIV prevalence rates, 9%, and a high-risk HPV positivity of 39% among women living with HIV, both contributing to the high burden of cervical cancer. We present the country's national response in mitigating the cervical cancer burden.
Methods: We conducted structured meetings and Key Informant Interviews (KII) with purposely selected representatives and/or officials of various donor agencies, university-based research programs, Malawi Ministry of Health (MOH) Reproductive Health Directorate (RHD), WHO Malawi officials and the United States President's Emergency Plan for AIDS Relief country site level implementing partners. The meetings were led by a visiting WHO Cervical Cancer Senior Clinical Expert and the KIIs were conducted by a Local Consultant who led the development of the country's cervical cancer Strategic Plan, and a medical officer who supported this work.
Results: The National Cervical Cancer Program (CECAP) coordinates the national response to cervical cancer control. The national response is built on the WHO's core principles of cervical cancer control that provides programmatic effective interventions across the life course of the disease to prevent HPV infection and cervical cancer. A National Cervical Cancer Strategic Plan (2022 – 2026) has been updated and is in use, with the National Cancer Control Strategic Plan (2019 – 2029), providing the overarching strategies for all cancers' control. Programmatic infrastructures of UNAIDS, Coalition of Women Living with HIV and AIDS, and the MOH Health Education Services have provided a strong foundation for the development of a national cervical cancer health promotion program. In 2018, the HPV vaccination for adolescent girls was rolled out countrywide with a health-facility based approach following a successful school-based pilot demonstration project. However, the national vaccination coverage has remained suboptimal. Since 2004, a national cervical cancer screening program using visual inspection with acetic acid and preventive therapy with cryotherapy and recently thermal ablation is also in place. Through partners, feasibility projects with HPV-based screening have been implemented with promising results. There have also been investments into scaling up loop electrosurgical excisional procedures, and cervical cancer surgeries with support from partners. Pathology diagnostic services are increasingly available but remain limited. There exists a huge gap in cervical cancer treatment infrastructure and services including for radiotherapy. The major challenges for the CECAP is severe under-financing, suboptimal organizational structure and weak operational infrastructures.
Conclusions: Major interventions to prevent and treat cervical cancer are underway in Malawi, despite limited investments and weak operational infrastructure. Financial assistance and technical support of multiple international donors and partner agencies have supported the national response to cervical cancer control with promising developments. A strong foundation for cervical cancer control initiatives covering the major pillars from primary to tertiary prevention exists, and it can serve as the catalytic force needed to rapidly move the country towards the 90-70-90 benchmarks of the 'WHO global strategy to eliminate cervical cancer as a public health problem' by 2030.

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ABVD for Hodgkin Lymphoma in Malawi; excellent outcomes but with persistent clinical disparities compared to high income countries: A prospective cohort study. Mponda M, Kudowa E, Kaimila B, , Kasonkanji E, Mumba N, Simwinga L, Tomoka T, Fedoriw Y, Painschab M.

Introduction: ABVD is a well-established curative-intent therapy for Hodgkin lymphoma (HL) but, to our knowledge, little has been published about therapy or outcomes in sub-Saharan Africa (SSA) where supportive care is more limited, infectious milieu is different, and in our case, radiation therapy was not available. We report mature data from one of the first prospective HL cohorts treated under real-world conditions in SSA.
Methods: Patients ≥15 years with newly diagnosed HL were enrolled in Malawi from Jul 2013 to Dec 2021 and followed for five years if remain in remission; patients not yet achieving five years or with relapse were censored May 2022. All participants had diagnosis confirmed by immunohistochemistry during telepathology conference between the team in Malawi and UNC Chapel Hill. A total of three patients were excluded from survival analysis; two were excluded because they were treated with CHOP chemotherapy due to misdiagnosis and one patient was diagnosed with nodular lymphocyte predominant Hodgkin (not classical Hodgkin). Staging was done by chest x-ray, abdominal ultrasound, and bone marrow biopsy. Participants were treated with ABVD chemotherapy and, if HIV+, concurrent antiretroviral therapy (ART). Post-progression therapy is generally limited to salvage chemotherapy regimens without access to radiation or autologous stem cell transplant.
Results: 38 participants were enrolled with mean age 29 years (SD 11). Twenty-one (55%) were men, and eleven (21%) were HIV+, of whom eight (73%) were on ART at HL diagnosis. Twenty-five (65%) participants had advanced stage disease and thirteen (35%) had limited stage disease, of whom ten were unfavorable risk and three were favorable risk. Bulky disease (at least one lymph node >10cm) was present in 29 (76%) participants at enrollment. Median CD4 count was 138 cells/□L (IQR 102-298) and 10 (91%) had an HIV viral load <400 copies/□L. Participants received a median six cycles (i.e. twelve doses) ABVD. Grade 3/4 neutropenia occurred in 15 (42%) but there were only two (5%) episodes of neutropenic fever and one episode of grade 3/4 anemia. There were no documented episodes of any grade cardiac or pulmonary toxicity. One patient was lost to follow-up, one patient absconded and died early in therapy, and one patient absconded and died during salvage therapy with median follow up 36 months for patients still alive at administrative censoring. Among patients with evaluable disease (n=34), 27 (79%) achieved a CR, three (9%) achieved a PR, and four (12%) had progressive disease. Among patients with limited stage disease, 2-yr overall survival (OS) and progression-free survival (PFS) were 91% (95% CI 51-99%) and 77% (34-94%), respectively. Among patients with advanced stage disease, 2-yr overall survival (OS) and progression-free survival (PFS) were 75% and 61%, respectively. There was no difference in survival by HIV status. Of eleven deaths during the study period, nine (82%) were due to disease progression, one due to therapy-related sepsis, and one due to other causes.
Conclusion: Most patients with HL in Malawi present with advanced or unfavorable risk HL. Treatment with ABVD is effective and well tolerated in Malawi with the vast majority of patients achieving a complete response and remaining in remission long-term. However, there is a marked disparity between outcomes with ABVD in high-income countries and improvements are needed to improve early diagnosis and provide therapy options for relapsed/refractory disease.
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Assessment of cervical cancer posters displayed in waiting areas for health education within health facilities in Mangochi district. Mdzeka DZ, Kambalame L, Kanyangw'a M.

Introduction: Cervical cancer posters have the ability to change people's behaviour and they have been widely used in general practice. However, little is known on how these posters are designed and utilized within health facilities in Malawi. This gives questions on whether their usage provides a setting of educating the public on the causes, prevention, treatment and management of cervical cancer. This study aimed at assessing the use of cervical cancer

posters displayed in the waiting areas within health facilities in Mangochi in terms of their design, utilization at the health facilities and how they are being used by the clients (public).
Method: The study used purposive study designs and data were collected from 156 questionnaires from health facility users (patients and guardians) found in the waiting areas and 10 health workers. Additionally, a checklist was used to assess how cervical cancer posters are designed. The data was analyzed by SPSS 20 with descriptive statistics and the data was presented using tables, bar graphs and pie charts. The qualitative data was analyzed by classifying what has been observed on the posters and later presented as a narrative.
Results: The findings of the study have shown that cervical cancer posters are underused in most waiting areas. Four reasons (negligence of the health workers, lack of responsible officer to hung and display cervical cancer posters, lack of supervision by District Management Health Team (DMHT) and unavailability of cervical cancer posters in some health facilities) have merged as facilitators and barriers to limited use of cervical cancer posters in the waiting areas. As such there was unequal distribution of posters as it was discovered that most waiting areas displayed more communicable disease posters than non-communicable disease posters. The findings also showed that one out of the two available cervical cancer posters found was following international poster designing standards like the use of balancing in poster layout and good graphics. This study has also shown that majority of the people who read the poster were able to remember the message on the cervical cancer posters and considered the message to be useful.
Conclusion: This study concludes that patients value posters in waiting areas. They perceived posters as being helpful in improving doctor interaction, health related knowledge, and self-management. It has also noted that the designing of the posters are critical in health education hence they need to be taken seriously. Lastly, the study concludes that health facility waiting rooms provide a setting to educate patients and other people who accompany patients to their appointments about health topics. The waiting rooms focus should be driven towards health promotion which helps in the reinforcement of already present knowledge. Efforts should be directed toward developing posters using simple words which can be easily understandable to the patients. Hence, waiting room should be upgraded, or the same information should be provided in newer way. Information in local language should also be displayed or made available at all times.
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Health-related quality of life among patients living with cancer at Queen Elizabeth and Kamuzu Central Hospitals in Malawi: An Exploratory cross-sectional study. Banda CB, Chagomerana C, Udedi M, Muula AS.

Introduction: Many cancer patients experience physiological and psychological challenges that affect quality of life during the trajectory of their disease process. We aimed at estimating quality of life among cancer patients attending oncology services at Queen Elizabeth (Blantyre) and Kamuzu Central Hospital (Lilongwe) in Malawi.
Methods: The study was conducted among 398 cancer patients using semi-structured questionnaire to capture data on socio-demographic and psychosocial factors. Quality of life was measured using a validated Euro Quality of Life Group's 5-Domain Questionnaires 3 Levels (EQ-5D-3L) tool.
Results: Mean age was 45 years ± 12.77. At least 18% of the participants had missed their clinical appointments. Pain (44%) was the most prevalent problem experienced by cancer patients. About 23% had worst imaginable health status on the subjective visual analogues scale. Attending cancer services at QECH (AOR= 0.29, 95% CI: 0.17-0.54, p<0.001) and having normal weight (AOR=0.25, 95% CI: 0.08-0.74, p = 0.012), were associated with improved quality of life. A history of ever taken alcohol (AOR= 2.36, 95% CI: 1.02-5.44, p = 0.045) and multiple disease comorbidities (AOR= 3.78, 95% CI: 1.08-13.12, p = 0.037) were associated with poor quality of life.
Conclusion: Loss of earning, pain, marital strife, sexual dysfunction, were among the common psychosocial challenges experienced. History of ever taken alcohol and having 3 or more comorbidities were associated with poor quality of life. There is need to integrate mandatory and comprehensive psychosocial education, psychosocial support and psychotherapy for cancer patients and their families to improve their quality of life and patient outcomes.
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Awareness, practices and willingness of mothers for human papilloma virus (HPV) vaccination of their daughters in Thyolo district Malawi. Bandawe F & Okonofua FE.

Introduction: Cervical cancer is one of the leading causes of morbidity and mortality amongst all gynaecological cancers worldwide. It occurs as a result of high risk oncogenic HPV types 16 and 18. Malawi is the second highest in incidence and the highest in mortality rate of cervical cancer globally. Vaccination against HPV has the potential to significantly reduce the global burden of cervical cancer, not just in Malawi but the whole World. Since the introduction of HPV vaccination among girls in Malawi, little was known about the deposition of mothers to HPV vaccination for their female children. The aim of this study was to assess awareness, practices and willingness of mothers who have a girl child aged 9-14 years in selected villages of Thyolo district in Malawi for HPV vaccination of their daughters.
Methods: The study was cross-sectional descriptive in design using quantitative method of data collection. Simple random sampling technique was used to select one traditional authority in Thyolo district of Malawi. Four villages from traditional authority Nchilamwera were also selected through simple random sampling technique with replacement. The study recruited 450 women who had a girl child aged 9 to 14 years and who were willing to participate in the study. Research hypothesis were as follows; there is no significant association between the level of awareness of HPV vaccine and mothers' characteristics, there are no significant predictors of the practice of HPV vaccination by mothers for their daughters in Thyolo district, Malawi and there are no significant predictors of willingness to accept HPV vaccine by mothers who never practiced HPV vaccine for their daughters
Results: Data was cleaned and entered into IBM SPSS version 25 (SPSS/PC 25.0) for analysis. Descriptive statistics (frequency and percentages) was used to analyze socio-demographic data. Chi-square and fishers exact was used to determine predictors of awareness, practice and willingness to vaccinate girls. Logistic regression analysis was used to determine the strength of association between dependent and independent predictors of knowledge, practice of HPV and willingness to accept the vaccine. Findings from this study showed that 388(86.2%) women were aware of HPV vaccine. The awareness was significantly lower in mothers from Chewa ethnic group (OR 0.221 CI 0.072- 0.682), Divorced (OR 0.327 CI 0.137-0.782), Not married (OR 0.286 CI 0.120-0.683). The awareness of HPV vaccine among those who were practicing farming (OR 11.870 CI 2.015- 69.921), doing business (OR 4.408 CI 1.897-10.246) and those with daughters aged 13-14 (OR 3.266 CI 1.244-8.576) were found to be significantly higher. The study also showed that 301 (67%) women did not vaccinate their daughters. predictors of practice of HPV vaccination by mothers' characteristics was found to be significantly lower among mothers who attended primary (OR 0.404 CI 0.171-0.953) and secondary education (OR 0.175 CI 0.069-0.446), Islam (OR 0.186 CI 0.043-0.808) those widowed (OR 0.251 CI 0.065-0.967). However, mothers aged 26-35 (OR 4.951 CI 1.504- 16.295), 36-45 (OR7.250 CI 2.199-23.904) and 46-55 (OR 13.304 CI 3.196 – 55.381) as well as those doing business as an occupation (OR 2.179 CI 1.131-4.198) were significantly higher. Among those women who did not vaccinate their daughters, 293 (97%) were willing to vaccinate their daughters if vaccine is available. Concerning the predictors of willingness to accept HPV vaccination for daughters among mothers of girls who did not practice HPV vaccination, this study did not produce significant results on mothers age group, place of residents, education level, occupation , income per household, and religion.
Conclusion: Since HPV vaccination is the only sustainable way to cervical cancer prevention, there is need for political will, involvement of other stakeholders to make HPV vaccination available to everyone. The study provides evidence based information on awareness, practices and willingness to HPV vaccination among girls through their mothers, which will assist researchers in incorporating it as part of their literature review, thus adding to the body of knowledge. Therefore, balancing the level of understanding and consumption of the services is vital.
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Impact of malnutrition on pharmacokinetics of chemotherapy in children with cancer: a systematic review. Schoon S, Makamo M, Uittenboogaard A, Bernhardt MB, Kaspers GJL, Huibers MHW.

Introduction: The majority of children with cancer in low- and middle-income countries (LMICs) are at risk for severe malnutrition which is related to decreased survival and increased toxicity. Malnutrition might affect the pharmacokinetics of chemotherapeutic agents and it is crucial to understand the impact of nutrition on toxicity and

survival. Therefore, a systematic review on the effect of malnutrition on pharmacokinetics of chemotherapy in children with cancer was conducted.
Methods: PubMed, Embase and Cochrane were searched in October 2021 to identify eligible studies. Inclusion criteria were studies on chemotherapy pharmacokinetics in children with cancer, assessing the effect of malnutrition specifically undernutrition. Risk of bias assessment was performed using the Quality Assessment Tool for Quantitative Studies. Malnutrition was defined by the World Health Organization (WHO) criteria and the Gomez classification.
Results: Four eligible studies with a total of 668 children were included, containing 18% (n=121) malnourished children. One study reported a significantly prolonged mean clearance rate and increased area under the curve (AUC) for vincristine among malnourished versus non-malnourished children. Clearance rates and volume of distribution of methotrexate, doxorubicin and etoposide were commonly lower in malnourished children.
Conclusion: Decreased clearance rates, increased AUC, and decreased volume of distribution among children with malnutrition and cancer are suggestive for significant pharmacokinetic alterations of chemotherapy. However, the data is scarce, the groups are small, and the majority of the studies have been performed in high-income countries where nutrition status is less compromised compared to LMICs. This systematic review highlights the need for further pharmacokinetic research among severely malnourished children with cancer in order to ultimately improve their outcome by adapted dosing of anticancer agents.
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Paclitaxel treatment of Kaposi Sarcoma (KS) can be provided in well-organized ART outpatient clinics.

Khalani J, Rambiki K, Wallrauch C, Painschab M, Rambiki E, Heller, T.

Introduction: Chemotherapy is required in many cases of HIV-associated KS. Malawi national guidelines recommend paclitaxel as first-line chemotherapy due to studies from sub-Saharan Africa showing clinical benefit of paclitaxel treatment. As KS incidence is high in Malawi, it is important to make treatment available outside of centralized oncology units if safe and manageable. The feasibility of providing paclitaxel-based chemotherapy in ART clinics has not been described.
Methods: In Lighthouse-KCH, six experienced ART nurses and four clinical officers were trained for half-day on paclitaxel treatment. Nurses were then paired with hospital oncology nurses for three days to practically learn safe reconstitution and administration of paclitaxel. SOPs and job aids were developed and in 2021 paclitaxel treatment was started as part of HIV integrated care at Lighthouse clinic. Routine patient data from January to December 2021 was summarized; additionally patients with available contact details were phoned (July 2022, three attempts on three days) to obtain follow-up information. Finally, HCW were interviewed about their experiences.
Results: 130 KS patients started treatment; 112 (85%) were male; median age 37 years (IQR 30-42); median BMI 21 kg/m2 (IQR 19-22). 97% were HIV positive. Information about ART duration was available for 100 patients; 38/100 patients started ART at time of chemotherapy, 37/100 were on ART for 1 to 12 months, 25/100 for more than a year to up to 18 years. Majority of patients 91/112 (81%) had tumors in T1 stage and 49/113 (44%) were in S1. 598 paclitaxel doses were administered successfully in the observation period; direct infusion reactions and paravasation were not observed. 63 patients received the initially planned six doses, 18 received five doses, and 49 patients received four or fewer. 67 patients were actively discharged (six cycles were completed or for tumor improvement); 8 patients (6%) died and 55 (42%) defaulted treatment. For 76 patients telephone numbers were available but only 45 phones reached; 37 (82%) patients were alive, 8 (18%) dead. Side effects were reported by 23/45 (51%); most of them minor including hair loss (n=16), nausea/vomiting (n=2) and burning/tingling sensations (n=2). Majority of clients 29/30 providing feedback on service satisfaction reported having been satisfied and had no complaints. However, one complaint was observed due to delayed pre-chemotherapy lab results. Health care workers (HCW) generally found prescription, reconstitution and administration easy and safe. Access to lab monitoring and second opinions was felt adequate; better access to blood for transfusion for few patients that needed transfusion before chemotherapy would be desirable. HCW who had experience with previous KS chemotherapy treatments felt paclitaxel was better tolerated.
Conclusion: KS treatment with paclitaxel is safe, feasible, and acceptable in ART clinics using standardized approaches. HCWs can cope with the complexity of treatment administration and management of patients to deliver quality care and

achieve client satisfaction. Side effects are usually mild and can be managed. Completeness of clinical data documentation especially client follow-up is challenging under routine conditions, however, leveraging ART services is vital in manage lost to follow-up and determining treatment outcomes. Studies are desirable to assess implementation of similar programs at ART clinics outside Lilongwe.

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A Comparison of Dosimetry and Clinical Outcomes in Patients Receiving Photon External Beam Therapy to the Pelvis: A Two Year Experience with 6MV and 10MV Photon Energies in Cervical Cancer Patients at Parirenyatwa Radiotherapy Centre, Zimbabwe. Banda CMK, Nyamhunga A, Ngara B, Ndlovu N.

Introduction: Radiotherapy efficacy depends, among other things, on the ability to deliver optimal radiation dose to the target volume while sparing normal tissue using different techniques, including 3-dimensional conformal radiotherapy (3DCRT). The photon energy determines penetrative power and thence ability to deliver adequate dose to the target. Higher photon energies are generally preferred when treating deep tumours like Locally Advanced Cervical Cancer (LACC) using 3DCRT.

In most low and middle income settings, availability of higher energies (≥10MV) is limited. At Parirenyatwa Group of Hospitals Radiotherapy Centre (PGH-RTC), also serving the whole Zimbabwe, is only one 10MV energy machine, which has other special characteristics suitable for multiple and unique tumour sites, thence needed the most compared to the 6MV machines available. There is paucity of data comparing 10 Megavoltage photon energy (MV) and 6MV plans and outcomes for treatment of pelvic tumours with 3DCRT. Pelvic tumours consist the majority of cancers needing radiotherapy in Zimbabwe and other developing countries. We aimed to compare dosimetric and clinical tumour outcomes between 10 and 6MV.

Methods: We retrospectively analysed medical records for LACC patients who received definitive concurrent chemoradiotherapy (CCRT) at for the period between 1st January 2017 and 31st December 2018. Patient's treatment plans were stratified into two arms according to the photon energies used (10MV and 6MV) and their respective dosimetric and clinical tumour outcomes at three months post-treatment were compared.

Results: A total 875 cervical cancer patients were seen during the study period, of these 82 met the inclusion criteria and were evaluated. Out of these, 20(24.4%) and 62(75.6%) patients were planned and/or treated with 10MV and 6MV photon energy respectively. The differences in minimum doses to the planned target volume and dose homogeneity index between the two photon energies were statistically significant (p-values 0.027 and 0.028 respectively), whereas the other dosimetric parameters (maximum & average doses to the planned target volume, conformity index and maximum doses to rectum, bladder, femoral heads and bowel) were not statistically significant (p-values of 0.245, 0.309, 0.130, 0.19, 0.35 and 0.42, and 0.16 respectively). Complete clinical tumour response at 3 months post treatment was 95% in the 10 MV arm compared to 91% in the 6 MV arm.

Conclusions: Statistical significance in only 2 of the 9 studied dosimetric parameters favouring 10MV photon energy brings forward a two way interpretation. On one hand, correlates with the superiority of higher energies in achieving homogeneity in deep tumours as compared to lower energies, on the other hand it reflect the fact that 10MV and 6MV represents the extremes of high and low energies respectively, which are close to one another and thence are practically capable of achieving similar dosimetric outcomes. This then explains the non-inferiority shown by 6MV plans in this study. This study showed that the dosimetric and clinical tumour outcomes in LACC patients receiving 3DCRT definitive CCRT using 10MV or 6MV in our setting are comparable. Follow-up prospective studies to further characterise the application of these photon energies in resource constrained settings is recommended.

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Paediatric palliative care education in sub-Saharan Africa. Bank R, Abenawe C, Bakulumpagi D, Nassanga I, Nakirulu A, Butia M, Casas J, Chinyundo K, Gaolebale B, Hesselgrave J, Huibers M, Mburu CM, Nyasulu C, Higgins J, Hockenberry M.

Introduction: Worldwide, there is tremendous need for paediatric palliative care (PPC) services. However in resource-poor settings, where services are highly needed, programs and training are scarce. To ensure feasible, acceptable,

accessible, affordable and effective PPC services, healthcare providers need to be trained with an affordable and effective program. The aim of this project was to develop an online PPC course for healthcare providers in sub-Saharan Africa.
Methods: The online course was developed by multidisciplinary PPC experts from Botswana, Malawi and Uganda. Five modules with 15 lectures provide the course foundation: introduction to palliative care, communicating with children and families, cultural, spiritual and bereavement considerations, symptom assessment and management, and care at the time of death. Each module contains videotaped lectures and case studies completed by the student. At the end of each module, a quiz is completed before moving on to the next module. Course certificates are awarded when all modules and coursework are finished.
Results: During the first months of the course launch, 105 participants enrolled and 52 completed the course. Students who completed the course were from Malawi (54%), Botswana (34%), Uganda (10%) and outside sub-Saharan Africa (2%). The majority of course participants were nursing/medical students (44%) followed by practicing nurses (33%) and medical officers (23%). Course evaluation evaluated knowledge gained and self-efficacy in end-of-life care: 96% agreed that the course met their educational needs and they felt more confident in providing care for a child receiving palliative care.
Conclusions: There is an urgent need for PPC training of health providers in resource-poor settings as the majority of children needing palliative care live in these countries. This online PPC course confirms the effectiveness of online distance-based learning and provides essential education that increased the number of providers comfortable in this important area of specialized care.
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Ultrasound findings in Kaposi Sarcoma patients – are they a sonographic confounder for TB diagnosis?

Gumulira J, et al Kumwenda T, Wallrauch C, Rambiki E, Heller T.

Introduction: Ultrasound, in particular the Focused Assessment with Sonography for HIV-associated TB (FASH) protocol, is frequently used in Malawi to investigate advanced HIV disease patients for findings suggestive of tuberculosis (TB). As Kaposi's sarcoma (KS) is also a prevalent condition in this patient population, there is a possibility that sonographic changes due to KS could mimic TB findings. We therefore conducted a prospective assessment of patients with newly diagnosed KS using ultrasound to describe sonographic findings in this patient population.
Methods: 30 consecutive patients with newly diagnosed KS, without diagnosis of TB, who were referred for paclitaxel treatment to Lighthouse clinic at Kamuzu Central Hospital were included. Demographic and clinical data were extracted. All patients underwent abdominal ultrasound to assess for effusions, enlarged abdominal lymph nodes and changes in liver and spleen using a b/w-ultrasound scanner (DP-30, Mindray, China) with convex and linear probe. Abnormal findings were documented and summarized.
Results: 22 male and 8 female patients, median age of 38.5 years, were included. All except one were HIV positive; 12 had not yet started ART, 10 had started recently (< 6 months) and 7 were taking ART for longer than 6 months. CD4 count results were available for 27; the median was 192 cells/mm3 with 14 (52%) having a CD4 below 200. All 14 had negative urine-LAM tests. Median BMI was 21.4 kg/m2. 10 patients were anemic (Hb<10mg/dl); 3 of them had severe anemia (Hb<8 mg/dl). ALT and creatinine were normal in all patients. The extent of the skin involvement was "limited" in 10 (33%) and "extensive" in 20 (67%); 17 (57%) patients had significant leg edema; oral involvement was seen in 17 (57%) patients, which was graded as severe in 5 (17%). A chest X-ray was available for 25 patients; it was suggestive of KS lung involvement in 10 (40%).
Using ultrasound, inguinal lymph nodes were found in 20 patients; in 3 (10%) additionally abdominal lymph nodes were found in the upper abdomen. Any pathological effusion was seen in 8 patients (27%): pericardial effusion in one (3%), pleural effusion in six (20%) and ascites in four (13%) patients. Three patients had mild splenomegaly (length 13-14 cm). Focal spleen lesions were found in 3 (10%) patients; all of the lesions were echogenic. In three patients an unusual "sponge-like pattern" of the splenic vasculature was found. 6 (20%) patients had echogenic focal lesions in the liver resembling hemangiomas; in two patients echogenic portal fields were seen.
Conclusion: Patients with newly diagnosed KS have effusions as well as enlarged lymph nodes, which could be interpreted as suggestive of TB, if KS skin lesions are not considered in the interpretation of the ultrasound findings. In solid organs like liver and spleen, focal lesions can be seen; as these are hyperechoic, they should generally not be mistaken for hypoechoic TB microabscesses. The lesions resemble hemagiomas compatible with the vascular nature of

the Kaposi's sarcoma. In three patients we documented a "sponge-like pattern" of spleen vasculature, which is to our knowledge not previously described.
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Increased tumor T-cell receptor repertoire clonality associates with HIV/ART status and improved outcome in a cohort of diffuse large B-cell lymphoma patients Roush S, Purunam K, Coelho J, Tomoka T, Gopal S, Painschab M, Fedoriw Y.

Introduction: Diffuse large B-cell lymphoma (DLBCL) is the most common lymphoma worldwide and is highly associated with HIV. DLBCL likely differs biologically based on HIV status and antiretroviral therapy (ART) exposure. Recent studies have suggested increased tumor T-cell receptor (TCR) repertoire clonality is associated with improved response to immune checkpoint inhibitors (ICI). HIV decreases CD4+ and naïve T-cell counts and leads to a clonal TCR repertoire due to T cells targeting HIV-specific epitopes. We therefore hypothesized HIV+ DLBCL would have more clonal TCR repertoires compared to HIV-.
Methods: The Kamuzu Central Hospital Lymphoma Study has prospectively enrolled patients with newly diagnosed lymphomas in Malawi since 2013. All patients receive standardized treatment and follow-up. We extracted DNA from 68 pre-treatment formalin-fixed paraffin-embedded (FFPE) DLBCLs from this cohort (QIAmp DNA FFPE Advanced) and performed TCR sequencing (immunoSEQ, Adaptive Biotechnologies). ART-experienced was defined as greater than 6 months of ART prior to DLBCL diagnosis. 36 FFPE tumors (n=12 HIV-, n=8 HIV+/ART-naïve, n=16 HIV+/ART-experienced) had >100 productive templates and passed quality control, meeting inclusion criteria for analysis. Of these, 2 tumors were EBV+ by EBER-ISH (n=1 HIV+/ART-experienced, n=1 HIV-). We used random downsampling to 100 productive templates for tumor analyses due to template count variation. To test associations with clinical/demographic variables, we used ANOVA with Bonferroni correction or Wilcoxon signed-rank test. For survival analysis, we generated binary variables from median cut-off, then calculated hazard ratios (HR) by Cox regression and produced Kaplan-Meier curves.
Results: TCR repertories from HIV+/ART-naïve tumors were more clonal than those from HIV- (productive Simpson clonality: 1.4 fold-change, adj. p=0.023; max productive frequency: 3.3 fold-change, adj. p=0.027) and HIV+/ART-experienced patients (productive Simpson clonality: 1.4 fold-change, adj. p=0.052; max productive frequency: 2.6 fold-change, adj. p=0.05). There were no differences between HIV- and HIV+/ART-experienced tumor clonality or in total productive template count by HIV/ART status. When analyzing HIV+ and HIV- tumors together, high clonality correlated with improved event-free (productive Simpson clonality: HR 0.26, p=0.011) and overall survival (productive Simpson clonality: HR 0.32, p=0.031). This trend was maintained when analyzing HIV+ and HIV- tumors separately. Age was not associated with tumor TCR clonality or outcome. Non-germinal center tumors trended toward worse event-free survival (HR 2.15, p=0.12), but not overall survival.
Conclusions: The TCR repertoire in HIV+/ART-naïve DLBCL was more clonal than HIV- and HIV+/ART-experienced cases. Longer duration of ART exposure prior to DLBCL diagnosis appears to restore overall TCR repertoire diversity in the developing tumor. Increased tumor TCR clonality associated with improved outcome in our cohort, irrespective of HIV/ART-status. Based on these results, HIV+/ART-naive DLBCL patients may represent a subset of lymphoma patients who would benefit from ICI.
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Notes:

Thank you for attending!