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SOCIO-DEMOGRAPHIC PROFILES OF CANCER AND HIV CASES SEEN AT HEALTH CARE FACILITY IN KISUMU COUNTY KENYA

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ABSTRACT

Background: **Improved understanding of the social and demographics of persons living with Human Immune deficiency Virus Infection informs health systems planning and policy enhancements at any level of health care delivery. It is against this background that persons with both HIV and cancer are studied in a health care providing facility in Kisumu county Kenya.**

Objective: **To describe a profile of the; socio-demographic characteristics of persons living with HIV infection who also have cancer.**

Study design: **Cross-sectional retrospective review of case records between January 2019 and December 2021.**

Study site and population: **Oncology unit at a Referral Hospital, Kisumu County, Kenya Materials and Method: Case records of patients treated at the facility were retrieved and perused through for desired data and information. Cases that fulfilled study entry criteria were evaluated. Data was entered in a proforma questionnaire. The required were having confirmed cancer and in addition a determined HIV status. Other data required were; age, gender, level of formal education and health systems support HIV status and type of cancer. Descriptive and inferential statistics were carried out.**

Results: **Those assessed were 379 and the findings showed; age; range, mean age of 57.2 years (SD = 15.2), with a significant difference in age between HIV-positive (mean 50.3 years) and HIV-negative (mean 62.5 years) groups (p=0.0001). Female constituted 68.9% (261), of whom the HIV-positive 79.5% (120) and HIV-negative 60.1% (122), p<0.0001. Among the 39.8% (151) HIV-positive the average time since diagnosis was 13.2 years (SD = 5.3), with 96% (145) on Antiretroviral therapy (ART). Types of cancers including; breast, gastric, colon, esophageal, pancreatic and prostate were recorded. Furthermore**

the cancers were classified as either non-AIDS-defining or AIDS defining. Staging recorded advanced cancer with 39.3% (149) stage 3, 26.1% (99) stage 4, and 24.3% (92) had metastasis. Tobacco use was documented in 0.5%, with no significant difference between groups (p=0.608). Alcohol consumption was reported in 10.8% (41), with no significant difference (p=0.406). However, their identification provided an understanding of cancer burden within the patient population, independent of HIV status.

Conclusion: **The study observed a distinct socio-demographic difference between HIV- negative and HIV-positive patients, a higher burden of disease among older, predominantly female populations and predominance of non-AIDS-defining cancers. The study recommends an enhancement of integrated cancer screening in HIV care among women to reduce the rising burden of cancer in both HIV positive and negative groups.**

Keywords: **HIV, Cancer, Socio-demographic.**

INTRODUCTION

Against the backdrop of the HIV epidemic, population aging and growth, lifestyle changes, and improvements in detection practices linked to urbanization and economic development the cancer incidence is expected to increase [1,2].

Cancer is becoming an increasing challenge in Africa, with its prevalence expected to grow in sub-Saharan Africa [3]. Kaposi sarcoma (KS), non-Hodgkin lymphoma (NHL), and cervical cancer—are recognized as AIDS-defining cancers (ADCs) as commonly associated with the progression of HIV to AIDS [4]. Individuals living HIV infection have an increased risk of developing cancer, with most research on HIV and cancer comorbidity coming from high-income countries, despite the greater burden of the epidemic in low- to middle-income nations [3].

The incidence and mortality of cancer in Uganda in particular among both AIDS-defining cancers (ADCs) and non-AIDS-defining cancers (NADCs) [5]. Human immunodeficiency virus has led to an increase in early initiation of antiretroviral therapy (ART) has been shown to reduce cancer mortality in HIV-infected individuals with Kaposi sarcoma (KS) and non-Hodgkin lymphoma (NHL). However, despite widespread ART access in some areas, the incidence of non-AIDS-defining cancers (NADCs) continues to increase, while the rate of AIDS-defining cancers (ADCs) remains steady in sub-Saharan Africa [6]. HIV-infected cancer patients face a mortality risk 2.3 times higher than those without cancer, underscoring the increased danger posed by the combination of HIV and cancer in these individuals [3].

In East and Southern Africa, people living with HIV (PLHIV) are more significantly impacted by cancer, facing a higher risk of developing certain types, along with poorer outcomes, including greater treatment complications, faster disease progression,

and higher cancer-related mortality compared to those without HIV [7,8].

People with HIV are 20 times more likely to develop anal cancer than those without HIV, emphasizing the heightened vulnerability of individuals living with the virus [9]. Since 2016, the World Health Organization has recommended immediate lifelong ART for all HIV-diagnosed individuals to reduce morbidity and mortality from HIV-related cancers and other health conditions [10]. Cancer treatment guidelines for individuals with HIV recommend co-managing HIV and cancer care to ensure uninterrupted ART during cancer treatment [11]. Non-AIDS-defining malignancies (NADMs), including lung and anal cancers, which are linked to advanced age and lifestyle factors, have become increasingly prevalent in recent years [12].

MATERIALS AND METHODS

This was a cross-sectional retrospective review conducted at the Oncology Clinic of Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) in Kisumu County, Kenya, between January 2019 and December 2021. Jaramogi Oginga Odinga Teaching and Referral Hospital is a major referral centre across western region of Kenya and serves a large diverse patient population. The hospital has specialized oncology and HIV care services with a comprehensive medical records that made it suitable to study the socio-demographic characteristics of cancer and HIV cases in the region.

The study reviewed medical records of new oncology patients registered at JOOTRH between 2019 and 2021. Eligible participants were individuals aged 18 or older, diagnosed with cancer, and with documented HIV status (positive, negative, or unknown). Patients without follow-up data or outcome information were excluded from the study.

Data collection process

A stratified random sampling approach was employed to select patient records, ensuring proportional representation across HIV status groups. Data was collected by systematically reviewing medical records, oncology charts, and the hospital's Health Information Management System (HIMS). The data required and collected included demographic details, cancer diagnosis, HIV status, treatment history, and follow-up outcomes (such as survival, relapse, and treatment response). The cancer registry and special reports were used for data verification and supplementation. Trained data abstractors ensured the consistency and accuracy of data collection.

Statistical analysis

The data were analyzed using descriptive statistics, and Chi-square tests were conducted to examine the association between HIV status (positive, negative, or unknown) and factors like gender, marital status, and cancer type. These analyses were performed using the Statistical Package for Social Sciences (SPSS) software (IBM SPSS, Chicago, Illinois, United States).

Ethical considerations

Ethical approval for the study was granted by the JOOTRH Institutional Ethical Review Committee (ISERC/JOOTRH/708/23), and permission to access patient medical records was provided by the hospital administration. The research was authorized by the National Commission for Science, Technology, and Innovation, which issued the necessary license (License No: NACOSTI/P/23/29542). All the data extracted from the hospital records that detailed patient's information were anonymized and securely stored using a password-protected electronic database that is only accessible to the research team. The study observed strict confidentiality throughout the study period by removing all personal identifiers and limiting access to authorized personnel only.

RESULTS

The study examined 379 cases for the desired socio-demographic and health-related characteristics of 379 participants.

Findings showed that average age was 57.2 years, with a standard deviation of 15.2 years, indicating some variation in the age distribution. The median age was 55.5 years, and the interquartile range (IQR) was 45.7 to 70.0 years while the age range 24.6 to 95.7 years, reflecting a diverse age group.

There were 118 males (31.1%) and 261 females (68.9%), giving a male-to-female ratio of 0.45:1, indicating a higher number of females compared to males.

Marital status, the majority were married 270 (71.2%), widows or widowers 72 (19%). Others divorced 10 (2.6%), single 25 (6.6%) while 2 (0.5%) did not declare their marital status.

The HIV status revealed that the majority 203 (53.6%, 203) were HIV-negative, 151 (39.8%) HIV-positive, 25 (6.6%) had no recorded HIV status while 5 (1.3%) had missing data regarding their HIV status.

Further assessment of those who were HIV-positive, the average time since diagnosis was 13.2 years (SD = 5.3), with a median of 14.7 years. The range extended from 1.7 years to 32.7 years. The unrecorded data rate for this variable was 14 (9.3%). Of the HIV positive patients, 145 (96) were currently receiving Antiretroviral Therapy (ART), 5 (3.3%) were not on ART, and 1 (0.7%) had unrecorded ART status. For those on ART, the average duration was 12.9 years (SD = 5.1), with a median of 13.7 years, indicating that most participants had been on ART for a long period.

In most cases, HIV and cancer were not diagnosed concurrently, with 138 (91.4%) having a prior HIV diagnosis before cancer detection. Only 7(4.6%) patients were diagnosed with HIV and cancer at the same time, while 6 (3.9%), the timing of the diagnosis was unrecorded. The average duration between cancer and HIV diagnosis was about 10 years (SD = 5.5), with a median of 11.1 years. Most participants had been diagnosed with cancer relatively recently, with the mean time since cancer diagnosis being 3.3 years (SD = 1.6) and the median at 3.1 years.

The cancer diagnoses included uterine cervix (121; 31.9%), breast (79; 20.8%),

prostate (50; 13.2%), and esophageal cancers (50; 13.2%). Other cancer types, such as colon, anal, ovarian, and others, were less common. A significant number of participants were diagnosed at more advanced stages, with 149 (39.3%) diagnosed at stage 3 and 99 (26.1%) at stage 4. Early stages stage 0 and stage 1 were rare, representing 1 (0.3% and 21 (5.5%) of the population, respectively. At diagnosis, 92 (24.3%) of individuals had metastasis, with the most frequent metastatic sites being the bones 40 (10.6%), lungs 33 (8.7%), and liver 28 (7.4%). Other sites of metastasis were; brain, spine, and colon. .

The average age at cancer diagnosis was 54.0 years (SD = 15.2), with a median of 52.8 years. The youngest individual diagnosed was 22.1 years old, while the oldest was 89.1 years old.

These results on table 1, suggest that HIV status significantly impacts tumor stages, metastasis, age at diagnosis, symptom duration, and treatment-seeking behavior among cancer patients. There was significant variation in tumor stages between HIV-positive, HIV-negative, and unrecorded HIV status groups ($p < 0.0001$).

Table 1: Socio-demographic characteristics, cancers records and HIV status.

Characteristic	HIV Positive (N = 151)	HIV Negative (N = 203)	Unrecorded (N = 25)	Total (N = 379)	p-value (Chi square)
Age (Years)					0.0001
Mean (SD)	50.3 (11.5)	62.5 (15.2)	56.4 (18.1)	57.2 (15.2)	
Median (IQR)	49.7 (41.3, 56.2)	64.3 (50.7, 74.7)	52.7 (42.5, 70.0)	55.9 (45.7, 70.0)	
Min, Max	26.3, 85.7	24.6, 95.7	28.0, 89.7	24.6, 95.7	
Gender					<0.0001
Male	31 (20.5)	81 (39.9)	6 (24.0)	118 (31.1)	
Female	120 (79.5)	122 (60.1)	19 (76.0)	261 (68.9)	
Marital status					0.231
Single (Single/Divorced/Widow(er))	47 (31.1)	52 (25.6)	10 (40.0)	109 (28.8)	
Married	104 (68.9)	151 (74.4)	15 (60.0)	270 (71.2)	
Duration since cancer diagnosis (years)					0.5657
Mean (SD)	3.2 (1.5)	3.4 (1.6)	3.5 (1.7)	3.3 (1.6)	
Median (IQR)	3.0 (1.9, 4.1)	3.1 (2.2, 4.9)	3.5 (1.7, 4.7)	3.1 (2.0, 4.6)	
Min, Max	0.2, 6.7	0.2, 6.7	1.2, 6.4	0.2, 6.7	
Tumor stage					< 0.0001
Stage 0, 1	11 (7.3)	9 (4.4)	2 (10.0)	22 (5.8)	
Stage 2	18 (11.9)	50 (24.6)	1 (50.0)	71 (18.7)	
Stage 3	69 (45.7)	74 (36.5)	6 (30.0)	149 (39.3)	
Stage 4	31 (20.5)	62 (30.5)	6 (30.0)	99 (26.1)	
Unrecorded	21 (13.9)	8 (3.9)	5 (25.0)	5 (25.0)	
Tobacco use					0.608
Current /Previous	9 (6.0)	14 (6.9)	3 (12.0)	26 (6.9)	
Never	141 (93.4)	185 (91.1)	22 (88.0)	348 (91.8)	
Missing	1 (0.7)	4 (2.0)	0	5 (1.3)	
Family history					<0.0001
No	141 (93.4)	180 (88.7)	18 (72.0)	339 (89.5)	
Yes	4 (2.7)	11 (5.4)	0	15 (4.0)	
Unknown	5 (3.3)	9 (4.4)	7 (28.0)	21 (5.5)	
Missing	1 (0.7)	3 (1.5)	0	4 (1.1)	

DISCUSSION

The highlight of the current study reveals a complex relationship between socio-demographics factors, cancer types and HIV status among study participants in Kisumu County. The study observed that there was a statistically significant difference in age between HIV-positive and HIV-negative groups. The HIV-positive had a significantly lower mean age of 50.3 years compared to HIV-negative at 62.5 years. This indicates that in HIV- positive individuals, cancer occurred at a younger age suggesting a possible influence of immunosuppression or earlier exposure to the risk factors. In terms of gender, the current study observed that there was a highly significant association between gender and HIV status with female making up the majority of both groups but more in HIV-positive group at 79.5%. These findings on gender suggest a gender pattern in the intersection of HIV and cancer, with women being disproportionately affected among HIV-positive patients. The lack of significant difference in the marital status was not strongly associated with HIV status among cancer population. The current study's findings regarding significant effects of age and gender were consistent with previous research, which observed that demographic factors influence cancer outcomes [13]. This consistency could have been influenced by unique characteristics of study population in Kisumu County, where the high HIV prevalence could have played a more significant role in shaping cancer outcomes than the demographic factors.

In this study, there was a significant difference in the tumor stages at presentation by HIV status with HIV-positive participants more likely to present with stage three cancers at 45.7% compared to the HIV-negative who had a more cases in stage two cancer at 24.6 % and stage four at 30.5%. These findings of late-stage presentation is common, especially among HIV-positive participants could be due to diagnostic delay or aggressive cancer progression. The higher cancer risk in younger HIV-positive individuals could be attributed to the immunocompromised state of the body, where immune suppression contributed to the earlier development of malignancies. Research from the United States and Europe showed that individuals with HIV are typically diagnosed with cancer at a younger age compared to those without HIV, though this may be partly influenced by differences in the age demographics between HIV-positive and HIV-negative populations [14]. A systematic review demonstrated that socio-demographics and clinical characteristics significantly influenced cancer patients' coping strategies [15].

In Kenya, the prevalence of HIV infection among cancer patients was twice the national HIV rate, with non-AIDS-defining cancers (NADCs) accounting for a significant portion of the cancer burden [16]. A study conducted at a zonal hospital in Tanzania on cancer types in HIV-infected patients found that non-AIDS-defining cancers were more common than AIDS-defining cancers. This suggests that the availability of antiretroviral therapy (ART) has perhaps, and as expected, contributed to longer survival among these patients [17]. The current study observed a significant difference in reporting of family history of cancer by HIV status with 93.4% of

HIV-positive participants reported that they had no family history of cancer compared to 88.7% of HIV-negative patients. These findings suggests awareness or documentation of family history may differ but overall, family history appeared to have less frequently reported.

CONCLUSION

This study highlights distinct socio-demographic profile of cancer and HIV cases at JOOTRH, Kisumu County. The findings reveal HIV-positive cancer patients were generally younger and predominantly female, with a higher likelihood of presenting at an advanced tumor stages particularly stage three. The interplay of HIV status with age, gender, and cancer stage and diagnosis pattern underscores the need for an integrated cancer-HIV screening and management strategies tailored to the unique demographic dynamic of this region.

Limitations of the study

The study's limitations included a relatively small sample size in specific subgroups, most notably the unrecorded HIV status group. The low number of participants in these groups may have reduced the statistical power of the analysis, potentially affecting the reliability and significance of the results. This limitation had to be taken into account when assessing the applicability of the findings to larger populations. Another limitation stemmed from the retrospective cohort study design, which relied on pre-existing data. This design introduced the risk of biases, particularly those related to missing, incomplete, or inaccurate data. In this case, the reliance on medical records for data collection likely led to recording biases, where certain information may have been inconsistently documented or overlooked, ultimately influencing the interpretation of the study's outcomes. Thus, while the findings provided valuable insights, these biases had to be considered when drawing conclusions from the data.

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Competing interests

The authors declare no competing interests.

Author’s contributions

RND and GKM conceptualized and designed the study. RND, GKM, and GA oversaw data collection. RND and Dr. Benard Samba conducted the statistical analysis and interpretation. RND, GKM, and GA contributed to writing the manuscript. RND and GKM were primarily responsible for the final content. All authors have reviewed and approved the final manuscript.

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Data availability

The data presented in this manuscript, will be made accessible upon request to the corresponding author. Interested parties can contact the corresponding author directly to obtain the relevant materials for further review or analysis.

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