

Hospital Based Cancer Statistics as an Initial Step towards Establishment of Effective Cancer Intervention in Tanzania

Khamis Othman Amour

Department of Natural and Social Sciences. Assistant Lecturer
The State University of Zanzibar
United Republic of Tanzania

Khamza Kibwana Maunda

Department of Oncology, Senior Oncologist
Ocean Road Cancer Institute
United Republic of Tanzania

Peter Kitau Msaki

Department of Physics, Professor
University of Dar es Salaam

ABSTRACT

There is an increasing public awareness that cancer in terms of increasing incidence rates and low curability become a serious problem in Tanzania. Due to limited human and physical resources in Tanzania, cancer interventions that address high incidences, curability and socio-economic impact must be given top priority. This information is often obtained in Population Based Cancer Registry (PBCR) which is not only lacking in Tanzania but its production requires relatively long period of follow-up and high cost of registration. Since establishment of effective cancer intervention is urgent, the desired information needed to accord this priority has been obtained from Hospital Based Cancer Statistics at Ocean Road Cancer Institute (ORCI). From this study, it was found that interventions of cancer of the cervix, breast, kaposi sarcoma, esophageal and head and neck has to be given high priority. It was also observed that treatment outcome for cervical cancer patients of all stages ranged between 34.2 % and 39.1% in the year 2010 and 2015 respectively. Using incidence, curability and socio-economic indices, the cancer type which require effective intervention are cancer of the cervix, breast and kaposi sarcoma. Implicitly, in the low cure rate of each detected cervical cancer in Tanzania compared to high cure rate reported in developed countries, early detection interventions and dose delivery accuracy should be improved.

Key words: cancer statistics; cancer incidence; cervical cancer; Tanzania; radiotherapy;

1. Introduction

Among the non-communicable diseases cancer is becoming a worldwide health burden in various part of the world in recent years due population's growth, increase of life expectancies, and adopts lifestyle

behaviors that increase cancer risk [1, 2]. In 2008, for example, about 12.7 million new cancer cases and 7.6 million deaths has occurred worldwide [3]. By the year 2012, cancer incidences had increased to 14 million new cases and 8.2 million deaths [4]. Earlier projection showed that over 18.1 million diagnosed with cancer in 2018 and 9.6 million would have died from this disease [5]. Since mortality-to-incidence ratio is high for several cancer types, especially in the country with low human development index (LHDI) [6], early detection and improvement of cancer care are necessary to decrease this burden. Reduction of cancer incidence rate as a method to lessen this burden is more difficult than reduction of mortality rate since causes of cancer are not as clearly understood. In case where cancer prevention intervention is possible, the prevention strategies are not as readily implementable as in cancer management intervention because in most cases preventive measures are voluntary. The interventions used to reduce the burden of cancer are therefore premised more in reduction of cancer morbidity by early detection especially for the cancer types with both high incidence and cure rate and cancer type that have high socio-economic impact on the society. Unfortunately this information varies from one region to another in developing world. For this reason, strategies for reduction of cancer burden in one nation, especially in developed world, cannot be directly applied in another nation like Tanzania without taking into consideration relevant cancer statistics which in this case, is population based cancer statistics. Since this statistics is not entirely available in many countries, many researchers have used hospital based statistics [7, 8, 9], to generate valuable information in the advancement of epidemiological data used in population-based cancer registry. Because of the increase burden of cancer in Tanzania in recent years, the hospital based statistics will enable hospital management to formulate a cancer management strategy that will have a visible and immediate impact in the Tanzania society. For this reason, this study aimed to produce such statistics for subsequent development of cancer management strategies and to provide a basis for evaluating the prognosis and survival rates of patients to reduce the increasing cancer burden in Tanzania.

2. Material and Methods

2.1 Study design and procedures

This was a retrospective study conducted at ORCI which is a specialized national hospital for cancer care and receives patients referred from all regions of Tanzania. The details of patients were retrieved from patients' files found in the registry department at ORCI. Information retrieved includes socio-demographic data, clinical presentation of patient, tumor type and stage, number of treatment fractions, and curability status of the disease. The study included all patients diagnosed with cancer and presented at the Institute from January 2005 to December 2015.

3. Results

3.1 Statistics of selected cancer types at ORCI

Among the 47,415 patients who attended cancer treatment at ORCI, 16,343 (34%) were diagnosed with cervical cancer (Table 1). The rapid increase and trend of cervical cancer and other four major cancer types in Tanzania were identified over a period of ten years from 2005– 2015 and presented in figure 1.

Table 1. Summary of new cases for selected cancer types for a period of 10 years at ORCI

Cancer type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cervix	879	955	1006	1288	1374	1510	1881	1896	1795	1867	1892
KS	286	295	404	418	447	681	814	789	654	680	674
Breast	206	244	245	275	322	386	526	667	705	733	742
Esophageal	196	181	256	282	307	380	511	573	601	625	643
Head&neck	174	155	206	244	272	289	361	386	411	427	439
Lymphoma	157	201	199	226	245	186	269	295	295	307	314
Leukemia	66	46	78	87	103	142	261	252	259	269	253
Urinary	63	46	88	87	98	109	153	168	168	175	182
Skin	79	40	108	111	123	129	141	147	147	153	161
Eye	61	46	76	80	95	84	119	131	134	139	143
Prostate	54	51	69	75	85	96	93	101	116	121	129
Others	195	467	403	307	305	203	115	124	179	186	192

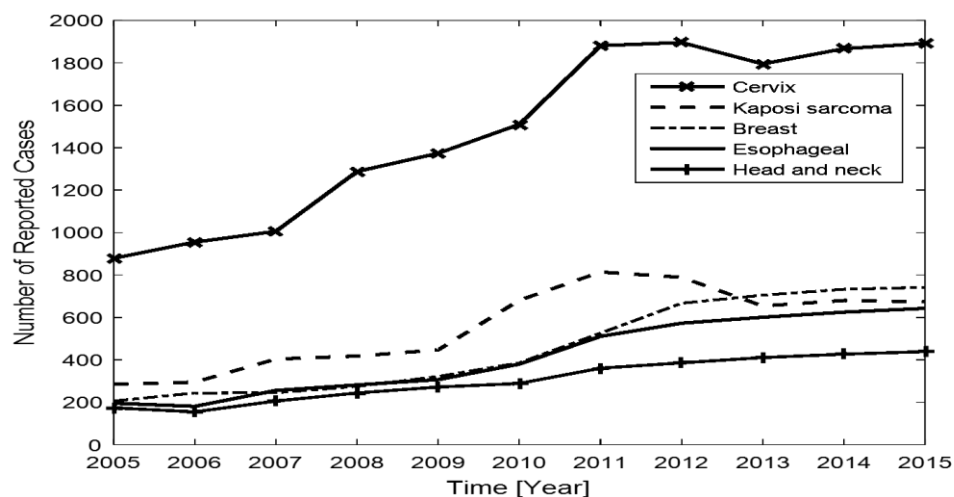


Figure 1: Reported incidence of five major cancer types at ORCI between 2005 and 2015

3.2 Distribution of cervical cancer patients according to Tanzania Zones

Among the reported cancer cases at ORCI, cervical cancer has the highest occurrence of all malignancies registered in this institution. Figure 1 shows cervical cancer as the leading disease with highest occurrence as compared with other four cancer types, namely, Kaposi sarcoma, breast, prostate and esophagus. This study has found that the coastal zone (Dar es Salaam, Pwani, Tanga, Lindi and Mtwara), have significantly high number of cervical cancer patients as compared with other Tanzanian zones. Table 2 show the distribution of cervical cancer patients as recorded at ORCI in the years 2010, 2015 and 2017 in different Tanzanian zones.

Table 2: Distribution of cervical cancer incidence according to Tanzania Zones

Zones	2010; n=758	2015; n=839	2017; n=1171
Coastal	54.28%	47.32%	38.59%
Lake	14.53%	18.62%	18.87%
Central	11.31%	11.68%	16.73%
Southern highlands	11.74%	11.62%	16.73%
Northern highlands	3.46%	6.29%	5.38%
Zanzibar	3.96%	3.45%	3.67%

Based on the statistics, cervical cancer patients at ORCI were also reported in terms of their disease stages (Figure 2). A total of 839 patients with intermediate-stage cervical cancer were admitted at ORCI between January 2015 and December 2015.

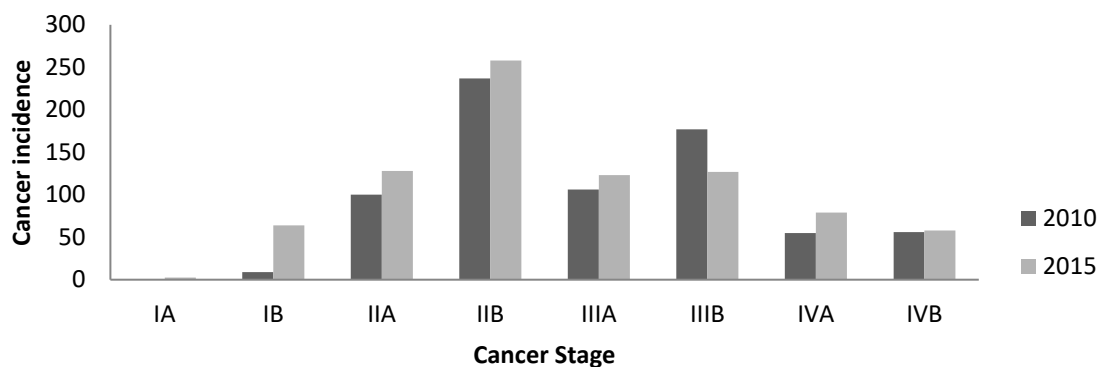


Figure 2: Cervical cancer incidences according to FIGO stage of diseases at ORCI in the year 2010 and 2015

3.3 Treatment assessment of cervical cancer

Treatment data were abstracted from patient's records and the treatment duration was the time between the first and the last fractions. Radiation dose was considered complete if the cervical cancer patient received the total dose that she was prescribed by the medical oncologist. Patient with no radiation dose or who did not complete prescribed dose were considered as absconded. In terms of cervical cancer treatment outcomes (Table 3), a high percentage of cervical cancer patients completed treatment sessions and their outcomes found to be good in the year 2015 as compared to the year 2010.

Table 3. Radiotherapy treatment outcome of cervical cancer patients at ORCI

Year	No. of patients	Complete radiotherapy	Absconded treatment	Cured	Not cured	Died at Hospital
2010	758	658(86.80%)	100(13.18%)	225(34.20%)	366(55.60%)	68(10.20%)
2015	839	519(61.86%)	320(38.14%)	203(39.10%)	211(40.70%)	105(20.20%)

Table 4. Features for assessment of effectiveness of cancer impact intervention at ORCI

Cancer type	Average incidence (2005-2015)	% incidence	Incidence score	Curability score	Socio-economic score
1. Cervix	16,343	34	4	4	4
2. Breast	6,142	13	3	4	4
3. Kaposi sarcoma	5,051	11	3	3	1
4. Esophageal	4,555	10	2	1	1
5. Head & neck	3,364	7	2	3	1

For cancer victims of age below 40 years, the socio-economic were given a score of 4; a score of 3 for ages below 50 years, a score of 2 for ages below 60 years and the rest a score of 1. Using these scores, the cancer types with high negative impact in Tanzania are breast and cervical cancers and therefore should be given high priority in the cancer intervention.

3.5 Cancer types with high incidence

According to Table 1, cancer of the cervix has the highest incidence rates in Tanzania followed by breast cancer. In developed countries, cancer of the breast has the highest incidence rate while cancer of the cervix remained to be the fourth in all women cancers [5]. The reasons for this existing difference are still unclear. According to incidence alone, what is also not clearly understood are the factors responsible for overtaken of kaposi sarcoma by breast cancer from the year 2013 and above. It is useful to note that since 2005 all cancer types have been increasing with time indicating that cancer intervention has not been expanded to match with the increase of cancer incidence due to population increase. To be effective, increase of cancer treatment facilities should be given preference to cancer types with highest incidence. In this case breast and cervical cancer need to be given highest priority in Tanzania.

4. Discussion

4.1 Distribution of cervical cancer patients according to Tanzanian Zones

High incidence rate alone is not a sufficient parameter for implementation of effective cancer intervention without looking into distribution of incidence in different zones. According to Table 2, the coastal zones should be given preference to cervical cancer intervention. However, increasing number of cervical cancer in this zone might be due to increase activities of screening programmes and increasing number of cancer diagnostic centers.

4.2 Cervical cancer incidence according to FIGO stage at ORCI

Cervical cancer remains the leading cause of death for women in Tanzania because most of the patient diagnosed with this disease at an advanced stage [10, 11]. This fact is also presented in figure 2 in which 68.30% of all patients registered in 2010 were diagnosed with stage IIB and stage III while only 3.95% of

the patient were at stage IB of the disease during time of diagnosis. The absence of stage IA in this year implies that the screening interventions have not been effective as desired. It has been reported that, late stages of cervical cancer is associated with low levels of knowledge on basic symptoms of cervical cancer, fear of the disease and stigma associated with cancer diagnosis, limited awareness of prevention and early detection methods and concerns about spousal disapproval of screening, and violations of religious and cultural obligations of modesty during screening procedures [12, 13, 14, 15].

4.3 Radiotherapy treatment outcome of cervical cancer patients at ORCI

The information about cancer of the cervix which is not well known, in the sub-Saharan countries, is the cause of low curability for cancer treated at early stages of development. If we classify early detection to be associated with stage IA to IIB, according to Figure 2, about 54% of cervical cancer reported at early stage while only 46% at late stage in 2010 and 2015. However the treatment outcome for cervical cancer presented in Table 3 show that during these years, average curability of cancer of the cervix regardless of disease stage, were about 36%. Of interest is the percentage of curability of early detected cancers which could be compared to 80% curability reported in advanced countries for this cancer. From Table 3, the early detected cancers during these two years were 54%. Of the 54% detected cancer for these years, only 53% were cured as opposed to the expected 80% reported elsewhere. There are two possible causes of the decreased cancer curability in Tanzania. The first one is that, as seen in Figure 2, early detection is skewed toward stage IIB as opposed to IA observed in nations with effective screening and cancer detection intervention. Therefore curability of the cervical cancer in Tanzania can be increased if the accessibility of screening and early detection intervention is increased. The second course is as already reported in the literature is that during treatment dose delivered to this cancer is not in the specified $\pm 5\%$ deviation from prescribed dose [11]. Thus, therefore is a great need to investigate the factors responsible for decrease dose delivery accuracy on how they can be used to improve cancer treatment in Tanzania.

5. Conclusion

Several issues have to be addressed to increase effectiveness of cancer intervention in Tanzania. Accessibility of diagnostic and treatment facilities for cancer with high incidence (cervix, breast and kaposi sarcoma) should be increased throughout the country. At the same time factors that influence treatment accuracy for the most prevalent cancer must be investigated in order to improve existing treatment protocols. For these strategies to be effective, training programmes for medical physicists should be introduced and that of radiation oncologists should be strengthened to fulfill the gap observing in the cancer treatment centers.

6. Ethical consideration

This study received ethical clearance approval from the Research Ethical Committee (REC) of University of Dar es Salaam. The permission to conduct this study was given from authorities of ORCI through its research, publication and ethics committee before the commencement of this study.

7. References

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