THE CENTRAL AFRICAN JOURNAL OF MEDICINE

Vol. 57, Nos. 9/12 September/December 2011

CONTENTS

Presentation patterns of invasive cancer of the cervix: Results from Parirenyatwa Oncology and Radiotherapy Centre, Harare, Zimbabwe 1998-2010

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Abstract

Main Objective: The study sought to identify the presentation patterns of invasive uterine cancer of the cervix (CaCx) in Zimbabwe in terms of histology, stage of the disease, ages of patients and socio-economic status.
Design: Retrospective study from 1998 to 2010.
Subjects: All patients who registered for the first time with invasive CaCx over a systematically selected sample period of four years (1998, 2002, 2006 & 2010).
Setting: The main referral Radiotherapy and Oncology centre in Harare the capital city of Zimbabwe.

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Results: Majority of patients (91.75%) presented with squamous cell carcinoma, 5.5% presented with adenocarcinomas and 2.75% presented with other types of histology. Late presentation was noted with the majority of the patients (89%) presenting with stage IIB and above. The common ages of patients at presentation were between 40 to 60 years. The majority of the patients (59.5%) were of low socio-economic status.

Conclusion: In the developed countries CaCx is reducing in frequency, presentation tends to be early, treatment effective and there is decreasing mortality rate from this disease. However in developing countries the situation is not as positive and the disease remains a major concern. This is shown by the presentation pattern of patients with invasive CaCx in Zimbabwe. The patients are shown to present with late stage disease of the squamous cell type, primarily in the age ranges of 40 to 60 years and with the majority of the patients belonging to the low socio-economic status group.

Cent Afr J Med 2011;57(9/12):43-49

Introduction

Cancer of the uterine cervix is the second most common cancer among women worldwide with a high incidence in Sub-Saharan Africa.[1] In developing countries such as Zimbabwe invasive cancer of the cervix (CaCx) is the most common cancer in females and also the leading cause of cancer related deaths in women.[2] The American Cancer Society[3] estimated that 12.710 million new cases of invasive CaCx were going to be diagnosed in 2011 and about 4.290 million women were going to die with invasive CaCx. The same author reported that there is a significant decrease in incidence and mortality rate of invasive CaCx in developed countries over the past three decades as compared to the developing countries. This was attributed to available options of disease prevention with the possibility of early diagnosis of the disease due to effective screening and accessibility to effective treatment procedures in developed countries. To this end it has been noted that women living in developed countries have a 208% greater chance of being successfully treated when compared with women in less developed countries.[4]

In Zimbabwe the ratio of patients with CaCx in relation to the total number of female patients with cancer registered per year for the periods 1990-2004 showed an upward trend.[5] While many Zimbabwean women are dying with invasive CaCx there are reports that with effective screening and Human Papilloma virus (HPV) vaccination in women, the incidence of invasive CaCx can be reduced to negligible levels making it a "preventable disease"[7] It has been identified that there is late presentation for treatment in most invasive CaCx patients in Zimbabwe due to inadequate CaCx screening resulting in poor prognosis and high mortality rates among CaCx patients in Zimbabwe.[8,9]

This study aimed at determining the presentation patterns of invasive CaCx in Zimbabwe in terms of histology, stage of the disease, ages of patients and socio-economic status.

Materials and Methods

This was a retrospective study of data gathered from files of patients with invasive CaCx for the period 1998 to 2010 to reflect information on their first registration. A systematically selected sample of 4 years was used with 1998 as base year (1998; 2002; 2006; 2010). The Oncology and Radiotherapy Centre at Parirenyatwa group of hospitals was the site of study.

Ethics

Permission was sought from the Clinical Director for Parirenyatwa Group of Hospitals through the Head of Department of the Parirenyatwa Oncology and Radiotherapy centre. The research proposal together with the letter of permission from the Head of Department of the Parirenyatwa Oncology and Radiotherapy centre were reviewed by The Cape Peninsula University of Technology (CPUT) Health and Wellness Research Ethics Committee to confirm that the proposed research process had taken into account the required ethical principles and an approval certificate was issued on 12 October 2010 with reference number REC-230408-04.

Patients' identification was kept confidential by using codes instead of actual patient names or file numbers.

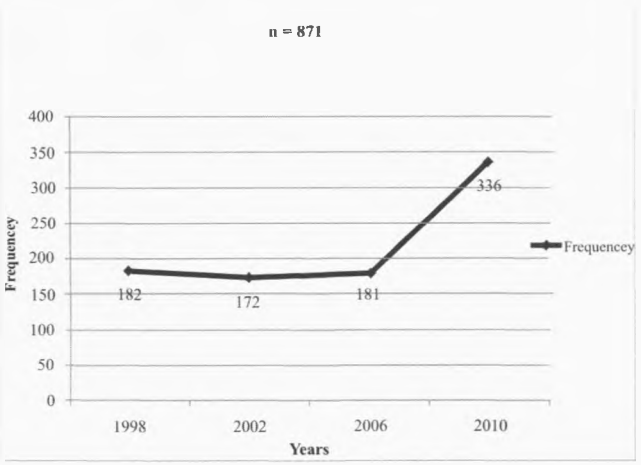
Statistics

All statistical operations which involved construction of graphs and trend analysis were done using Microsoft excel package. In trend analysis an R^2 value of less than 0.1 was considered insignificant.

Results

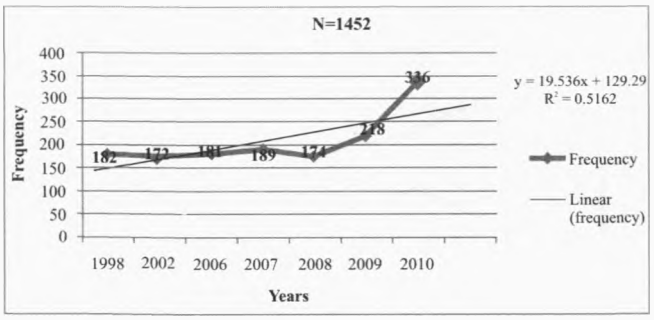
The data collected during the study were tabulated and analysed to bring out the presentation patterns of invasive CaCx in Zimbabwe in terms of histology, stage of disease, age of patients, and the socioeconomic status of the patients.

Figure I: Registered patients (1998-2010).



The number of newly registered patients for 1998, 2002, and 2006 was almost constant and then there was an outlier in 2010 of a frequency of 336. In order to find out whether the change was abrupt or was gradual during the years between 2006 and 2010 another line graph (Figure II) was drawn with the number of patients who registered in 2007, 2008 and 2009 included.

Figure II: Registered patients 1998-2010 (2007, 2008, and 2009 included).



The frequencies for 2007 (189), 2008 (174) and 2009 (218) were within the same range with the other 3 years (1998, 2002 and 2006), and 2010 still remained an outlier with 336 patients being registered.

Figure III: Histology 1998.

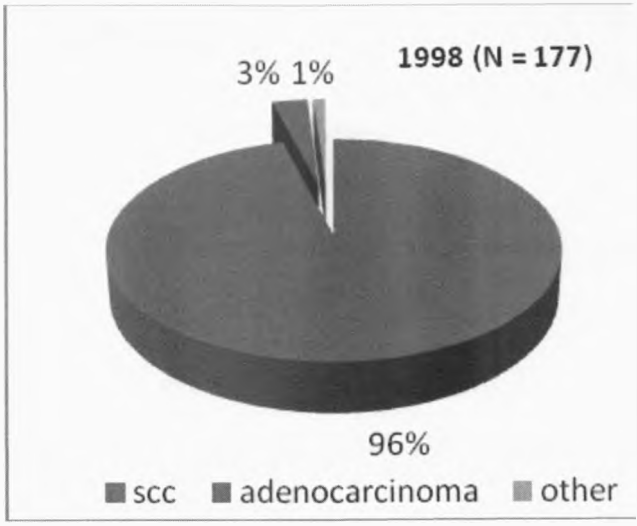


Figure IV: Histology 2002.

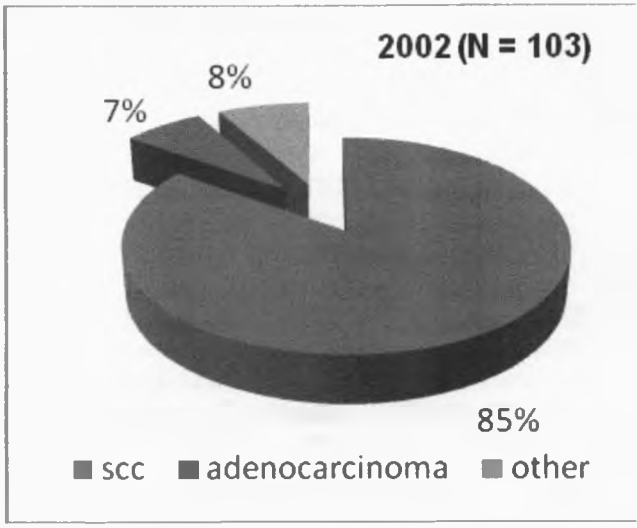


Figure V: Histology 2006.

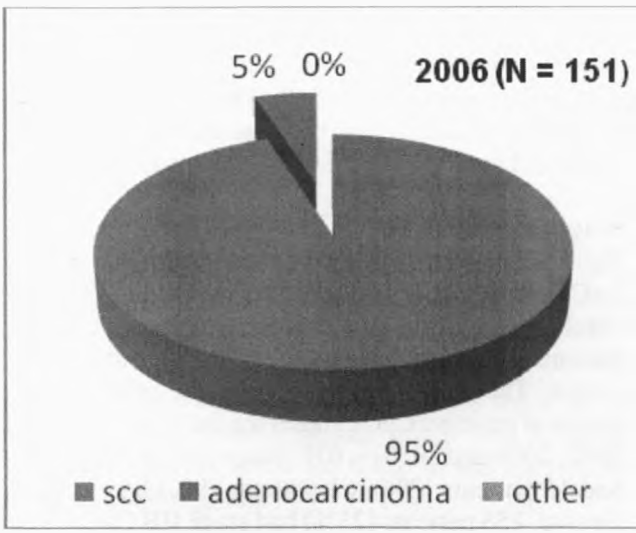
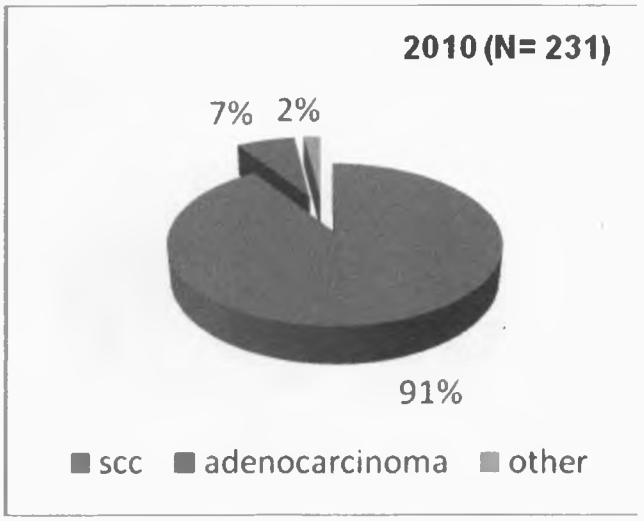
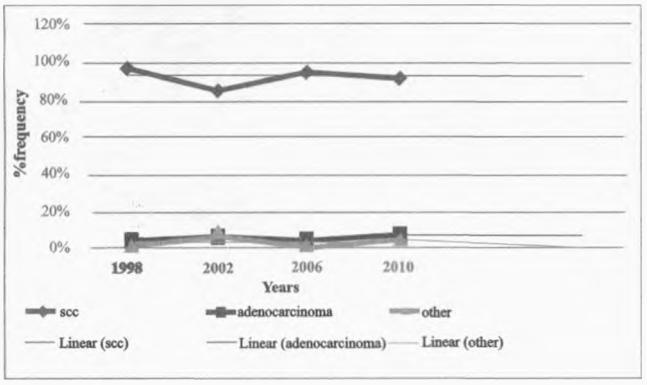


Figure VI: Histology 2010



Squamous cell carcinoma (SCC) had the highest percentage frequency in all the four years with 96% in 1998, 85% in 2002, 95% in 2006 and 91% in 2010. The occurrence of Adenocarcinoma had an occurrence of 3% for 1998, 7% for 2002, 5% for 2006 and 7% for 2010.

Figure VII: Histology 1998-2010.



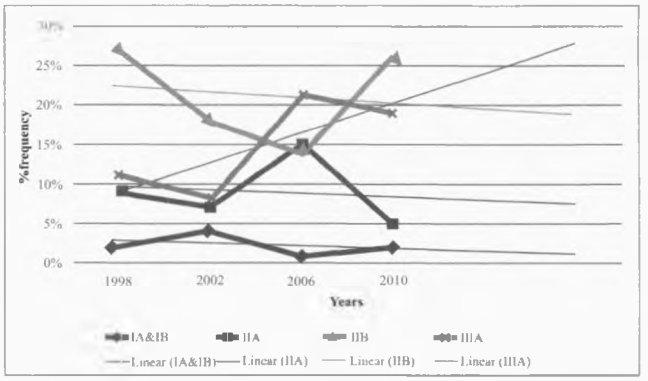
Trend lines:	SCC	$y = -0.005x + 0.93$	$R^2 = -0.0167$
	Adenocarcinoma	$y = 0.01x + 0.03$	$R^2 = 0.4545$
	Others:	$y = 0.005x + 0.04$	$R^2 = 0.0323$

There is a weak upward trend for adenocarcinoma type with an R^2 value of 0.4545. The R^2 values for the squamous cell carcinoma type and other histologies are so small that they are statistically insignificant.

Stage of the disease

The FIGO staging system was used in staging invasive CaCx. In all the analyses stages IA and IB were combined to form one category because very few patients presented with such early stages at the study centre. The total number of patients with recorded stages of invasive CaCx stages for the four years (1998, 2002, 2006 and 2010) is 675. Stages IA and IB category had 15 patients (2%), 61 patients (9%) had stage IIA disease, 156 patients (23%) had stage IIB CaCx. In the category for stage IIIA disease there were 107 patients (16%), those with stage IIIB disease were 162 (24%). The number of patients with stage III (A+B) disease was 109 (16%) and those with stage IV disease were 65 (10%). The majority (89%) of the patients presented late with stage IIB and above.

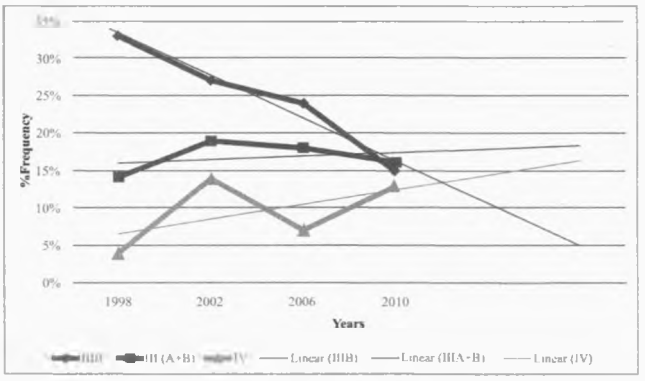
Figure VIII: Disease stages IIIA and below (1998-2010).



Trend lines:	IA&IB:	$y = -0.003x + 0.03$	$R^2 = 0.0947$
	IIA:	$y = -0.001x + 0.095$	$R^2 = 0.001$
	IIB:	$y = -0.003x + 0.23$	$R^2 = 0.0035$
	IIIA:	$y = 0.039x + 0.0055$	$R^2 = 0.6745$

Stage IIIA trend line shows an upward trend with an R^2 value of 0.6745. Category for stages (IA & IB) has a slow downward trend with an R^2 value of 0.0947. The R^2 values for the category for stages IIA and IIB are not statistically significant.

Figure IX: Disease stages IIIB to IV (1998-2010).



Trend lines:	IIIB:	$y = -0.057x + 0.39$	$R^2 = 0.9627$
	III(A+B):	$y = 0.005x + 0.155$	$R^2 = 0.0847$
	IV:	$y = 0.02x + 0.045$	$R^2 = 0.2899$

The trend lines for stage IV shows a slow upward trend with an R^2 value of 0.2899. The R^2 value (0.0847) for stage III (A+B) is not statistically significant. Stage IIIB trend line shows a strong downward trend with an R^2 value of 0.9627.

Ages of patients at presentation.

In 1998 the minimum age (22 years) was in the (20 to < 30 years) age group and the maximum age (88years) was in the (80 to < 90 years) age group. The mean, median and modal ages for 1998 were 48.8 years, 48 years, and 45 years respectively. The mean, median and mode all lie in the same age group (40 to < 50 years).

In 2002 (figure XI) the minimum age (23 years) was in the (20 to < 30 years) age group and the maximum age (88 years) was in the (80 to < 90 years) age group. The mean, median and modal ages were 51 years, 48 years and 42 years. The mean age lies in the (50 to < 60 years) age group and the median and modal ages lie in the (40 to < 50 years) age group.

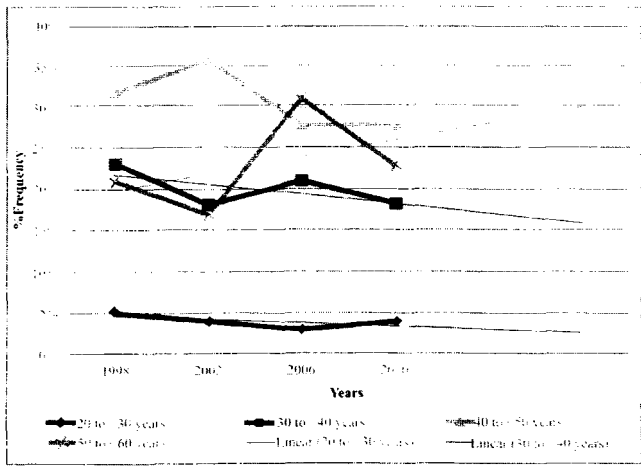
Figure XII shows the age distribution for the year 2006. The minimum age (23 years) was in the (20 to < 30 years) age group and the maximum age (83 years) was in the (80 to < 90 years) age group. The mean, median and modal ages were 50.1 years, 50 years and 53 years respectively. All the averages (mean, median and modal ages) lie in the (50 to < 60 years) age group.

The age distribution for patients who were registered in 2010 is shown in figure XIII. The minimum age (28 years) was in the (20 to < 30) years age group and the maximum age (88 years) was in the (80 to < 90 years) age group. The mean, median and modal ages were 52.6 years, 50.5 years and 42 years respectively. The mean and the median belong to the (50 to < 60 years) age group and the modal age group was (40 to < 50 years).

Table I: Measures of central tendency and dispersion.

Measures	1998	2002	2006	2010
Mean age	48.8 years	51 years	50.1 years	52.6 years
Median age	48 years	48 years	50 years	50.5 years
Modal age	45 years	42 years	53 years	42 years
Minimum age	22 years	23 years	23 years	28 years
Maximum age	88 years	88 years	83 years	88 years
Standard deviation	12.5	14.4	11.8	13.7
Skewness	0.36	0.67	028	0.37

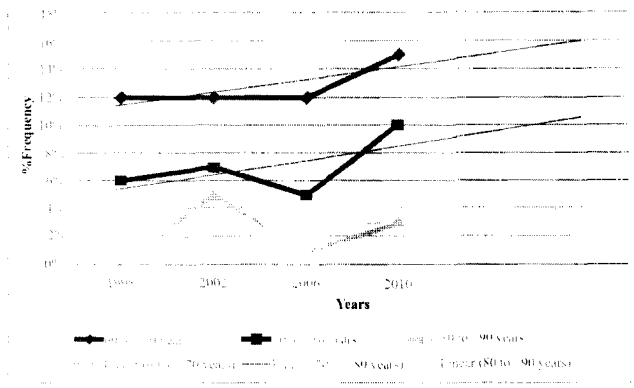
Figure XIV: Line graphs and linear trend lines for ages of patients (20 to <60 years).



Trend lines:

20 to <30 years:	y = -0.004x + 0.05	R^2=0.4
30 to <40 years:	y = -0.012x + 0.23	R^2=0.4
40 to <50 years:	y = -0.02x + 0.36	R^2=0.4545
50 to <60 years:	y = 0.02x + 0.18	R^2=0.1923

Figure XV: Line graphs and linear trend lines for ages of patients (60 to <90 years).



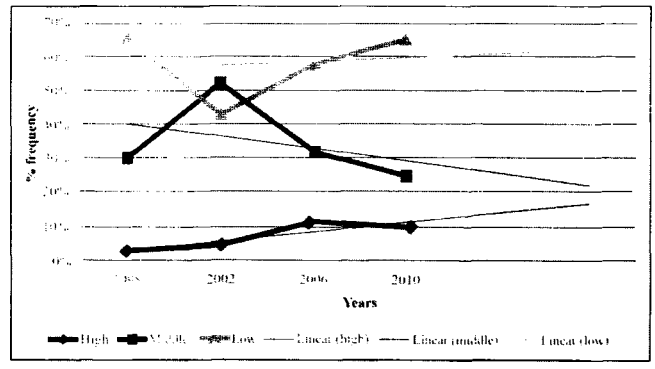
The general appearance of the trend lines demonstrate a downward trend for all the young aged group of patients of ages (20 to < 30 years), (30 to < 40 years) and (40 to < 50 years) and an upward trend for the remainder of the age groups (50 to < 60 years), (60 to < 70 years), (70 to < 80 years) and (80 years to < 90 years).

Socio-economic status

Three categories were used to describe socio-economic status of patients where those who were employed and resided in the cities were defined as of a high socio-economic status, those not employed and residing in the city or employed and residing in the rural areas were defined as of a middle socio-economic status and those unemployed and residing in rural areas were defined as belonging to the low socio-economic status group.[10]

The majority (113) 66% of the patients belonged to the low socieconomic status in 1998. In 2002 the majority (69) 52% were of the middle socieconomic status. In 2006 (76) 58% and 2010 (149) 65% were the majority and these belonged to the low socio-economic status group.

Figure XVI: Line graphs and linear trend lines for patients' socio-economic status.



A weak downward trend was noted for those in the middle socio-economic status group and a strong upward trend was noted for those in the high socio-economic status group.

Discussion

The number of patients registering with invasive CaCx in Harare Zimbabwe remained almost constant in 1998 (182), 2002 (172) and 2006 (181). The sudden increase in 2010 could not be attributed to population changes in the country since the population figures for 2010 (11.7 million) were lower than the population figures of 2006 (12.8 million).[11,12]

However according to the Zimbabwe Ministry of Health and Child Welfare (ZMHCW)[10] the health delivery system in Zimbabwe is linked to the socio-economic condition of the country.One of the reasons why there was such a sudden increase in the number of patients registering with invasive CaCx in 2010 could be that in the previous decade Zimbabwe experienced severe economic difficulties. The situation worsened in 2008 which resulted in the closure of some public hospitals and even those hospitals that remained functional operated at very low capacity. As a result most people who required medical attention suffered at home without treatment.[10] In 2009 the economic situation began to improve due to the introduction of the multicurrency[13] and this could have contributed towards the sudden increase in the number of patients who registered in 2010. This conclusion is further confirmed by the Association of Health Funders of Zimbabwe (AFHoZ) [14] which pointed out that the medical insurance bill for 2010 was far higher than any bill that was recorded for the previous ten years. After incorperating the figures for the three years between 2006 and 2010 an upward linear trend with a rate of increase of 19.54 was recorded which is in line with what was reported in Sub-Saharan Africa where an increase in the number of patients registering with invasive CaCx was observed.[15,16] This is in sharp contrast to what is happening in developed countries where invasive CaCx is becoming uncommon due to effective screening, early detection and HPV vaccinations.[7]

The majority of the patients (89%) presented with late stage disease from stage IIB and above and an upward trend was recorded for disease stages IIIA and above with the exception of stage IIIB. The expected survival rate is reduced from 90% for stage I disease to 50% and 10% for stages II and III respectively.[17] This then translates in high mortality rates for invasive CaCx patients in sub Saharan Africa. [2,18] In Zimbabwe the situation is reported to be worse than the other surrounding countries due to the inadequacy of facilities for screening and prevention.[9,11,19] It was recommended that the governments of the sub Saharan Africa need to recognise cancer as a major public health concern and allocate resources for screening, prevention, treatment and research.[20]

It was noted that there is a downward trend of the number of young (below 50years) women presenting with CaCx. This is in contrast with the argument by Sekerime and Gray[20] who after carrying out a study in Uganda concluded that the prevalence of Human immuno-deficency virus (HIV) has resulted in an increase of the number of younger women (mean age of 35.8 years) presenting with invasive CaCx.

It is also important to note that during the period(1998- 2010) the difficult economic situation resulted in a number of people including women, emigrating. Also those that could, went to South Africa or Botswana for treatment of cancer of the uterine cervix. This affected the validity of the trend analysis as the population at risk did not remain the same but changed by an unknown proportion.

Conclusion

The majority of the patients (91.75%) presented with squamous cell carcinoma (SCC), 5.5% presented with adenocarcinoma and 2.75% with other histologies. It was found that (89%) of women presented with late stage disease (stage IIB and above). A downward trend was observed for stages IIB and below and for stages IIIA and above with the exception of stage IIIB, an upward trend was noted. The most common age of patients at presentation was between 40 to 60 years. Trend analysis indicated that there is a decrease in the number of patients presenting at ages below 50 years while those above 50 years are increasing. The majority (59.5%) of the patients were of low socio-economic status.

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