

The cost of treating skin cancers in a teaching hospital in Makurdi, Nigeria

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Abstract

Background: Patients with skin cancer are fairly common in our practice. We lack data on the cost of treating these patients. This data is important for policy formulation and resource allocation. We studied the socioeconomic burden of skin cancer on patients presenting to our institution.

Methods: A 3-year retrospective study of patients with histologically-confirmed skin cancers presenting to the Benue State University Teaching Hospital, Makurdi from April 1, 2012 to March 31, 2015 was done. Relevant data was extracted from the patients' records.

Results: Records were available for 43 patients with a mean age of 46±18 years. The total direct cost of treatment was ₦8.741m with a median of ₦0.173m and interquartile range of ₦0.229m.

The care of squamous cell carcinoma (SCC) patients, who made up the largest proportion of patients, took up 46.7% of the total cost and melanoma 39.1%. Melanoma had the highest average cost per patient of ₦0.312m. The relative youth and active employment of the patients contributed to the indirect costs by creating a significant loss of productivity.

Conclusion: Skin cancer care places a significant burden on the patients, their families and the entire society.

Key words: Skin cancer, economic burden, care, Makurdi, Nigeria

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Introduction

Skin cancers are the most commonly diagnosed malignancies worldwide.¹⁻³ Though the incidence is lower in Nigeria than in other parts of the world they are still a very important cause of morbidity and, to a lesser extent, mortality especially among persons with albinism.⁴⁻¹⁴ It is estimated that there are 65,258 new cases of skin cancer in Nigeria annually giving a projected annual incidence of 52 per 100,000.¹⁵ This creates a significant burden on the patients and their families, the health care systems and the economy of the state.¹⁶

The cost of skin cancer treatment includes the direct cost of hospitalization and treatment along with the indirect costs such as lost man hours, psychological distress to the patients and their loved ones, loss of skilled and experienced workers and the social impact of post-treatment scarring.¹⁷ With recent advances in cancer therapy, survival has improved but with a huge financial cost and a potentially-daunting gauntlet of complications to run.^{18,19}

We have observed a fairly high incidence of skin cancers in our practice and decided to study the socio-economic burden of care for skin cancer patients seen at Benue State University Teaching Hospital, Makurdi with the possibility of providing essential data that will be useful in management policy formulation.

Materials and Methods

A retrospective study was conducted to review the records of patients presenting at the Benue State University Teaching Hospital (BSUTH), Makurdi, Nigeria over a three-year period: April 1, 2012 to March 31, 2015.

Patients

We retrieved the records of all patients who presented with skin lesions histologically-confirmed to be malignant following a biopsy and had complete records. Having sought and received ethical approval from the Human Research Ethics Committee of the hospital, records of patients were retrieved and relevant data including cost data, age, occupation, duration of symptoms, length of hospital stay, histological diagnosis, potentially-oncogenic viral infections, surgery done and outcome was extracted. With assistance from relevant departments including pharmacy, medical records and transport, the cost data was calculated from records of payments for hospitalization, surgery, drugs, laboratory investigations, outpatient visits and wound dressings. The data was grouped under the histologic subtypes and presented in tables. Median with IQR was used to

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present continuous data that was skewed. Discrete data was presented as frequency with proportions.

Results

Demographics

The records of 43 patients were reviewed. There were 21 males and 22 females, giving a male: female ratio of approximately 1:1. The ages ranged from 20 to 78 years with a median of 43 years and interquartile range of 30 years. The 20-29 years group constituted the highest proportion of patients (ten patients, 23.3%), followed by the 40-49 years group with nine patients constituting 20.9% of total (Table 1).

Farmers (37.2%) were more commonly affected than others. The duration of symptoms before presentation ranged from one to one hundred and sixty-eight months with a median of 14 days and interquartile range (IQR) of 24 days.

Nineteen patients (44.2%) had squamous cell carcinomas (SCC) with a median age of 40 years and IQR of 34 years. Melanomas and Kaposi's sarcoma (KS) each accounted for 25.6% of the cases (Figure 1) with mean ages of 59±12 years and 37±12 respectively. There were two cases of basal cell carcinoma (BCC) accounting for 4.7% of the total. Both patients were female with a median age of 50.5 years and IQR of 21.5 years. The other histologic types of cancer had a male to female ratio of approximately 1:1

Table 1 - Clinicodemographic Factors

Variables		Histologic diagnosis			
		BCC	SCC	Melanoma	Kaposi's Sarcoma
Age groups in years	20-29	1(50.0)†	8(42.1)	0(0.0)	1(9.1)
	30-39	0(0.0)	1(5.3)	0(0.0)	6(54.5)
	40-49	0(0.0)	3(15.8)	3(27.3)	3(27.3)
	50-59	0(0.0)	3(15.8)	2(18.2)	0(0.0)
	60-69	0(0.0)	2(10.5)	3(27.3)	1(9.1)
	70-79	1(50.0)	2(10.5)	3(27.3)	0(0.0)
Occupation	Professional	0(0.0)	1(5.3%)	0(0.0)	0(0.0)
	Farmer	0(0.0)	7(36.8)	8(72.7)	1(9.1)
	Artisan	0(0.0)	4(21.1)	0(0.0)	6(54.5)
	Student	1(50.0)	5(26.3)	0(0.0)	1(9.1)
	Housewife	1(50.0)	1(5.3)	0(0.0)	0(0.0)
	Non-Professional	0(0.0)	1(5.3)	3(27.3)	3(27.3)
Viral infections	None	0(0.0)	15(78.9)	7(63.6)	4(36.4)
	HIV	0(0.0)	3(15.8)	1(9.1)	7(63.6)
	HCV	2(100.0)	0(0.0)	3(27.3)	0(0.0)
	HIV+HBV	0(0.0)	1(5.3)	0(0.0)	0(0.0)
Duration of symptoms (months)	< 12	0(0.0)	6(31.6)	3(27.3)	5(45.5)
	12 - 23	0(0.0)	4(21.1)	3(27.3)	4(36.4)
	24 - 35	0(0.0)	4(21.1)	1(9.1)	2(18.2)
	36 - 47	0(0.0)	0(0.0)	2(18.2)	0(0.0)
	48+	2(100.0)	5(26.3)	2(18.2)	0(0.0)
	Mean 27.95±32.71				Median 14 IQR 24
Length of Stay(days)	0-7	2(100.0)	10(52.6)	0(0.0)	10(90.9)
	8-14	0(0.0)	1(5.3)	1(9.1)	0(0.0)
	15-21	0(0.0)	1(5.3)	4(36.4)	0(0.0)
	>21	0(0.0)	7(36.8)	6(54.5)	1(9.1)
	Mean 14±15				Median 7 IQR 23
Outcome after a year	Failed to Follow-Up	0(0.0)	17(89.5)	6(54.5)	11(100.0)
	No recurrence or metastasis	1(50.0)	0(0.0)	1(9.1)	0(0.0)

† n(%) along the columns

The total direct cost of treatment for all the patients was estimated to be eight million, seven hundred and forty-one thousand Naira (₦8.741m) (Table 2). The median cost was one hundred and seventy-three thousand naira (N0.173m) and IQR of ₦0.229m. The range was N2.824 million (N0.186-3.010 million). Hospital in-patient care (34.4%) took the highest share of the direct cost while surgery (27.1%) was second highest. The least direct cost was on dressings (2.1%). The care of SCC patients, who made up the largest proportion of patients, took up 46.7% of the total cost while 39.1% was spent on melanoma patients. Two patients had basal cell carcinoma and took up 2.9% of the cost.

Seventeen patients (39.5%) had infectious viral infections (). Human Immunodeficiency Virus (HIV) infection was most common (11 patients, 25.6%). Kaposi's sarcoma patients (63.6%) were most commonly infected with HIV. One patient with squamous cell carcinoma (SCC) had both HIV and Hepatitis B Virus (HBV) infection.

The length of hospital stay (LOS) ranged from 0-63 days with a median of seven (7) days (). Patients with melanoma and SCC spent the most time in hospital. The least LOS was among the Kaposi sarcoma (KS) patients who were largely treated as day cases (10; 91%) and spent an average of 3.46 days. The SCC

Table 2 - Direct Costs in millions of Naira*

Variables	BCC	SCC	Melanoma	Kaposi Sarcoma	Total
Hospital Inpatient Care	0.035(10.3)†	1.442(35.3)	1.341(39.3)	0.192(19.4)	3.010(34.4)
Surgery	0.090(35.4)	1.051(25.7)	0.938(27.5)	0.291(29.4)	2.370(27.1)
Drugs	0.060(23.6)	0.921(22.6)	0.502(14.7)	0.271(27.4)	1.754(20.1)
Laboratory Tests	0.032(12.6)	0.373(9.1)	0.262(7.7)	0.103(10.4)	0.770(8.8)
Outpatient Visits	0.030(11.8)	0.208(5.1)	0.306(9.0)	0.107(10.8)	0.651(7.5)
Dressings	0.007(2.8)	0.090(2.2)	0.064(1.9)	0.025(2.5)	0.186(2.1)
Total	0.254(100.0)	4.085(100.0)	3.413(100.0)	0.989(100.0)	8.741(100.0)
Range	0.083 (0.007-0.090)	1.352 (0.090-1.442)	1.277 (0.064-1.341)	0.266 (0.025-0.291)	2.824 (0.186-3.010)
Mean	0.127 (±0.065)	0.215 (±0.129)	0.310 (±0.073)	0.090 (±0.072)	0.203 (±0.128)
Median	0.127	0.165	0.303	0.058	0.173
Interquartile Range (IQR)	0.046	0.212	0.112	0.029	0.229

* One naira = .00276 euro = 0.00315 US dollar = 0.00244 pound sterling

† n(%) along the columns

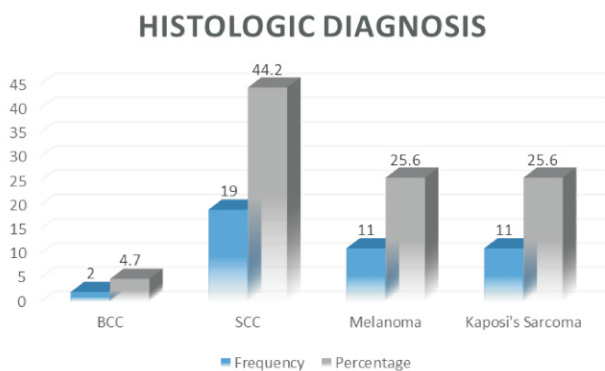


Figure 1 - Histologic Diagnosis

patients spent an average of 15 days in hospital with seven of them (36.8%) treated as day cases. The 11 melanoma patients were all treated as in patients and spent an average of 24 days in hospital.

Most of the patients (79.1%) failed to follow-up on their treatment on discharge after surgery. Four patients (9.3%) died in the course of the study. Half of these died during the initial treatment. Two patients (4.7%) had recurrence while three patients (7.0%) were referred to other institutions for various reasons.

Discussion

The total direct cost of treatment in our study was N8.741m with an average cost of N0.203m per patient. A large proportion of our services are heavily-subsidized by the Benue State Government and donors who support HIV treatment especially the US Government.²⁰ These subsidies were not taken into consideration while calculating the direct costs. Hospitalization, surgery and

drugs made up the bulk of the financial burden. The most amount was spent on SCC patients and the least on BCC patients. Melanoma had the highest average cost per patient treated and KS the least. In the United States, the annual cost of treating non-melanoma skin cancer (NMSC) is estimated at \$4.8b while melanoma costs \$3.3b and is increasing very rapidly.^{3,16,21} In Canada, the total direct and indirect costs of treating skin cancer were C\$66.05m and C\$465.7m respectively.²² Melanoma treatment constituted 83.4% of these, BCC 9.1% and SCC 7.5%.²² In the US, \$3.2b is lost annually due to productivity losses from melanoma deaths among adults 20 years and older.²³ Melanomas constitute only 4% of all skin cancers in Canada but 80% of the mortality.²² Melanomas constituted 25.6% of our patients and 75% of all mortalities. Some of our patients would have benefited from new, advanced but more expensive treatment especially patients with metastatic melanoma. Vemurafenib and ipilimumab produced improved rates of overall and progression-free survival in patients with metastatic melanoma but at a huge cost.^{18,19} A cycle of treatment with ipilimumab costs US\$120,000.¹⁹ It is also associated with a daunting array of adverse effects in 64% of patients.¹⁹ In Nigeria the minimum wage is ₦18,000 (US\$56.7) and the labour productivity was N713.77 (US\$2.25) in 2016 (cf US\$64.1 for the US in 2012).^{24,26} Labour productivity is the amount of labour input required to produce a unit of output and is an indicator of real wages. With the very low wages recorded, it will take a superhuman effort to make such drugs available to our patients.

Most of the patients studied were in the very productive phase of their lives. Most were less than 50 years of age and economically active. A sixth of the

patients were students but this being an agrarian state, it is safe to bet that many of these students along with some of the white collar workers were part-time farmers. The time spent away from work by the patients and their family members during the course of the illness is especially significant as farming is a time- and labour-intensive enterprise which has little tolerance for absenteeism. The same goes for artisans and self-employed professionals whose livelihood largely depend on their being constantly available to their clientele. The lost productivity is not limited to the patients and their families but extends to the employers and society as a whole.¹⁶

A significant number of patients were found to be HIV-positive. Most of the HIV-positive patients had Kaposi's sarcoma (KS) which is strongly associated between HIV infection.²⁷⁻³⁰ Nigeria has an HIV prevalence rate of 3.4% with Benue's 3.6% being the 9th highest prevalence rate among the states.³¹ The co-existence of HIV infection and KS increased the burden of care.^{27,29} The oncogenicity of HIV is well-documented and cutaneous non-Hodgkin's lymphoma along with rare skin cancers like Merkel Cell Carcinoma (MCC) and sebaceous carcinoma have been closely linked with HIV infection.^{27,29} A Merkel Cell Polyomavirus which causes this rare neuroendocrine skin cancer, MCC, has recently been discovered and highlights the potential oncogenic properties of viruses which may have a causal link with skin cancer.³² It is also known that HIV infection can alter the phenotype in NMSC and prognosis is poorer in HIV-infected cancer patients.²⁸ The incidence of NMSC is also twice as high in HIV-positive patients as in HIV-negative subjects.³⁰

The average duration of symptoms before presentation was 28 months. Most of the patients studied presented late with 67.4% delaying presentation for more than a year. This worsened the severity of the disease and impacted negatively on the prognosis, morbidity and mortality. In the US, melanoma is often diagnosed at later, advanced stages in non-whites.³³ More advanced disease requires more extensive and expensive treatment.¹⁹ BCC and SCC are highly curable if detected early and treated properly.^{34,35} The five-year survival rate for patients whose melanoma is detected and treated before spread to the lymph nodes is 98 percent.^{34,36} The five-year survival rates for regional and distant metastases of melanoma are 62 percent and 18 percent, respectively.^{34,36}

The average length of hospital (LOS) stay was 14 days. Most of the patients spent less than eight days in hospital. The cost of hospitalization was the greatest contributor (34.4%) to the direct financial burden of care in this study. This is similar to the findings of Warren et al in a US study which examined the trends in the treatment

costs of all cancers.³⁷ In the Canadian study, hospitalization costs contributed 19.6 % of the total direct cost with primary care and surgery having greater costs.²²

Most of our patients failed to turn up for follow-up visits after discharge. Most of the HIV-positive patients were receiving treatment at various primary care facilities and continued their treatment there. A large proportion of our patients were rural dwellers who had to spend large amounts of money on transport for each clinic visit. The poor follow-up rate made it quite difficult to get accurate data on treatment outcome and the cost of adjuvant therapy.

Conclusion

The burden of skin cancer care is a multifaceted concept that has far-reaching implications. This study highlights the burden borne by the patients and their families, the caregivers and the society in facing the challenge of skin cancer. A well-designed and wider prospective study which incorporates different research methods and utility tools will do better justice to this topic and assist the policy makers in making better provision for the care of skin cancer patients.

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