

## The Cases of Cancer seen at a Botswana Hospital 1968-1972

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### SUMMARY

A report is given on the cases of cancer seen at Princess Marina Hospital, Gaborone, Botswana in the years 1968 to 1972 inclusive. In all, 193 cases were seen, not all diagnosed on histological grounds. The commonest malignancies seen were those of the cervix and oesophagus, representing 16.6 per cent. and 16 per cent. respectively of the total. No cases of colonic or rectal cancer were seen. It is probable that these figures represent an under-estimation of the incidence of cancer in Botswana.

Botswana is a country the size of France but with a population estimated at 630 379 at the 1971 census. Of these, 24 907 were estimated to live within 10 miles of the capital, Gaborone.

Princess Marina Hospital, Gaborone, acts as a general hospital for that area, and as a referral hospital for the rest of the country particularly for surgical and gynaecological cases. The hospital has had a surgeon since it was opened in 1967, except for 1969, but only a maximum of four other doctors. No histological services are available in Botswana, specimens being sent to the Royal Army Medical College, London, although pathology technicians do other work, and there is a radiographer.

David Livingstone (1857), who spent much of the early part of his career in Africa in the Northern Cape Province and Bechuanaland, as Botswana was then called, is on record as saying that cancer was rare among the Bakwena of Bechuanaland — the Bakwena being one of the eight Tswana tribes in the Country. This view of the rarity of cancer in Africans was not limited to Bechuanaland. However, it has since become clear that this is not the case, and that cancer is not a rare disease among Africans anywhere in the continent (Davies *et al.*, 1964; Gelfand, 1971; Oettle, 1967; Templeton and Bianchi, 1972a) although there are marked variations in the incidence of various types of cancer within the continent, and an overall difference in pattern from that seen in Europe or America (Burkitt, 1973; Davies *et al.*, 1964; Hutt, 1973).

### MATERIALS AND METHOD

There being no Cancer Registry in Botswana nor even any properly organised medical records departments, cases of cancer were found by a hand search through inpatient case notes, from the author's personal records, from operation registers, and from files of histology reports. Outpatient records were not checked as they were far too numerous. This has led inevitably to an under-recording of cases as some patients seen in outpatients with probable cancers have either refused admission or had the disease in such an advanced form that treatment was impossible. Such patients were not admitted, and returned to the care of their families. Incomplete inpatient case notes also led to several cases being discarded.

As histological specimens have to be sent outside the country and take several weeks to return, not all operation specimens are sent. This leads to an underdiagnosis of malignant conditions in, for example, prostatic carcinomatous infiltration of a clinically benign tumour, and means that not all clinically suspected cancers are proven histologically. In this series, therefore, cases of cancer diagnosed on clinical and radiological grounds have been included as well as those with histological proof.

Not all the cases recorded came from the Gaborone district, many were referred from hospitals throughout Botswana. The fact, coupled with underdiagnosis and poor case recording, means that true frequency and incidence figures for either the Gaborone district, or Botswana as a whole cannot be given. The figures are presented as relative frequencies for cancer cases seen at Princess Marina Hospital, and even these figures lie somewhere between the relative frequencies for the Gaborone district and for Botswana.

### CASES RECORDED

The number of cases of malignant disease recorded at Princess Marina Hospital, Gaborone in the five year period 1968-1972 are set out in Table I. This table also gives the numbers of cancers in each sex as well as the relative frequencies for the total numbers and for males and females.

The majority of cases were seen in adults. Only four cases of acute myeloid leukaemia, two cases of Hodgkin's Disease, one case of ameloblastoma, one cerebral tumour, and one case of haemangiopericytoma which was locally invasive were recorded in children.

Altogether 193 cases were recorded with 105 being in males, and 88 in females. Oesophageal

cancer was the commonest cancer seen in men with tumours of the stomach, liver, penis and prostate in that order next, although many fewer cases were recorded than for oesophageal cancer. Carcinoma of the cervix was by far the commonest cancer in women, contributing over a third of the cases. Breast tumours and malignant melanomas were the only other cancers recorded in women at a rate of more than one a year.

TABLE I

The numbers of cancer cases seen in the period 1968-1972 giving the sex incidence and the observed frequencies.

Site	Totals		Observed Frequencies		
	Male	Female	Total %	Male %	Female %
Cervix	—	32	16,6	—	36,4
Oesophagus	28	3	16,0	26,6	3,4
Breast	—	13	6,7	—	14,8
Stomach	8	3	5,7	7,6	3,4
Melanoma	3	6	4,7	2,9	6,8
Hepatoma	7	1	4,1	6,7	1,1
Penis	7	—	3,6	6,7	—
Prostate	7	—	3,6	6,7	—
Reticulo-endothelial	4	2	3,1	3,8	2,3
Myeloid	—	—	—	—	—
Leukaemia	6	—	3,1	5,7	—
Cerebral	3	2	2,6	2,9	2,3
Skin	—	—	—	—	—
(squamous cell)	4	1	2,6	3,8	1,1
Ameloblastoma	2	3	2,6	1,9	3,4
Neck Secondaries	—	—	—	—	—
Primary unknown	3	2	2,6	2,9	2,3
Pancreas	3	1	2,1	2,9	1,1
Oral cavity	1	2	1,6	1,0	2,3
Thyroid	—	3	1,6	—	3,4
Tonsil	3	—	1,6	2,9	—
Uterus	—	3	1,6	—	3,4
Salivary gland	2	1	1,6	1,9	1,1
Larynx	3	—	1,6	2,9	—
Kidney	1	1	1,0	1,0	1,1
Vulva	—	2	1,0	—	2,3
Ovary	—	2	1,0	—	2,3
Fibrosarcoma	1	1	1,0	1,0	1,1
Paranasal sinus	2	—	1,0	1,9	—
Osteogenic sarcoma	—	2	1,0	—	2,3
Lung	1	—	0,5	1,0	—
Tongue	—	1	0,5	—	1,1
Vagina	—	1	0,5	—	1,1
Pharynx	1	—	0,5	1,0	—
Bladder	1	—	0,5	1,0	—
Testicle	1	—	0,5	1,0	—
Anus	1	—	0,5	1,0	—
Haemangiopericytoma	—	—	—	—	—
shoulder	1	—	0,5	1,0	—
Spinal cord	1	—	0,5	1,0	—
Totals	105	88	—	—	—

No cases of colonic or rectal cancer were seen in the period under review.

DISCUSSION

From the figures that are presented here, it is clear that cancer is not rare in Botswana as David Livingstone suggested, even allowing for the underdiagnosis and poor recording of cases already mentioned. However, cancer is not as common a problem as it is in Europe and America, even if the true incidence could be estimated. This is because of the high incidence and mortality from the diseases such as gastro-enteritis, malnutrition and measles in children, and tuberculosis in all sections of the population. As deaths from these conditions are eliminated, cancer will probably become more common. In the United Kingdom, for example, cancer is the most important cause of death in children between 1 and 14 years after accidents, poisoning and violence, owing to the decline in infectious conditions as a cause of mortality (Taylor, 1973). In Botswana, with only nine cases of cancer recorded in children during the five year period, cancer is a very minor cause of death in children.

The types of cancer seen were different not only from Europe and America, but from other parts of Africa (Table II). However, the

TABLE II

Order of frequency of various sites of cancer in England and Wales (1961-3) compared with the frequency of cancer in Rhodesian Africans and Batswana. Based on Gelfand (1971).

England and Wales (European)	Rhodesian Africans	Batswana
1. Breast	Skin	Cervix
2. Stomach	Bladder	Oesophagus
3. Intestine	Reticulo-endothelial growths	Breast
4. Lung	Cervix	Stomach
5. Ovary	Oesophagus	Melanoma
6. Cervix	Liver	Liver
7. Rectum	Lung	Penis and Prostate

pattern did conform to the general pattern seen throughout Africa where tumours of the lung, colon, rectum and body of the uterus are known to be uncommon (Burkitt, 1973; Hutt, 1973). Breast cancer was the second commonest tumour in women whereas in the rest of Africa it is less common than in Europe and America, although not as infrequently seen as the tumours just mentioned (Burkitt, 1973; Hutt, 1973).

*Cervix*

Although carcinoma of the cervix is said to be a preventable disease (W.H.O., 1964), it is the commonest site of cancer in the African woman, representing 20-40 per cent. of all the tumours in most series (Cook and Burkitt, 1971). In the series it represented 36,4 per cent. of all tumours in women.

Another factor concerning the disease in Africa is the late stage at which patients usually present. In a three year period from December 1968 to November 1971, 706 cases of cervical carcinoma presented at two large African hospitals in Rhodesia. Of these 70 per cent. were in stages three and four of the disease (Frost, 1972). In this series 22 cases, 68,8 per cent. of the total were in stages three and four of the disease. In the absence of any radiotherapy in Botswana, no form of treatment other than analgesics is available for these women, many of whom are under 50 years of age.

There are several factors associated with a high incidence of cervical carcinoma, namely low socio-economic status (at least in early life), early first intercourse, pregnancy and marriage. Factors associated with a low rate are circumcision in males and a high standard of hygiene (Bras, 1967). All the positive factors apply to Botswana women. Ritual circumcision is not practised among Botswana males, and the standards of hygiene are low.

*Oesophagus*

One of the features of carcinoma of the oesophagus in Africa has been the increase in incidence in recent years in several regions (Cook and Burkitt, 1971; Gelfand, 1971; Oettle, 1967; Robertson, 1969), although there are still areas where the disease is rare (Colles *et al*, 1972; Hutt and Burkitt, 1965).

Links between the disease and the drinking of beer prepared from maize have been demonstrated (Cook, 1971; McGlashan *et al*, 1968), as well as between smoking and oesophageal cancer in Rhodesian Africans (Wapnick *et al*, 1972) where it is the fourth commonest tumour in males (*Central African Journal of Medicine*, 1972).

No reliable figures for the frequency of oesophageal carcinoma exist in Botswana so it is not possible to say whether an increase has occurred here, but the disease can be said to be a common tumour and was the commonest tumour among males in this series. Only three cases occurred in females, and this rarity is the rule in Africa (*Central African Journal of Medicine*, 1972).

Home brewed beer is drunk in Botswana and is brewed from sorghum and mealie meal in earthenware pots, although metal drums — often empty oil drums — are used in the towns and larger villages. Sugar is not used in the brewing process. Smoking is unusual among rural Botswana, and is therefore unlikely to be a causative factor here.

Only half the cases of carcinoma of the middle and lower oesophagus are operable at the time of presentation in Britain (Young-husband and Aluwihare, 1970). In this series where 29 of the 31 cases were in the middle and lower oesophagus, only six were operable. Of these five had an oesophagectomy done, two died in the post-operative period, one died of recurrent disease 21 months later, and two have been lost to follow-up. The other case declined operation. The remainder were inoperable by virtue of evidence of mediastinal spread or a very long stricture and were palliated by the insertion of Celestin tubes, although with a considerable mortality due to the extreme emaciation with which these patients presented.

*Breast*

Cancers of the breast are said to be less common in sub-Saharan Africa than in Europe and America, although not as rare as some other sorts such as colonic and uterine cancers (Burkitt, 1973). But, as can be seen from Table II, breast cancer was more common in this series than in Rhodesian Africans, although not as common as in England.

As with other cancers, late presentation of breast cancer is common in Botswana. Complete infiltration of the breast, usually with ulceration and fixation to the chest wall, coupled with fixed axillary nodes, is all too often the state of the tumour by the time the woman presents at hospital. Even when the tumour is still removable, there is a pronounced resistance to mastectomy. Only in those cases where the whole breast is involved in mastectomy acceptable, and here it is often impossible to operate. Fortunately, in three such cases, the tumour has regressed with hormone therapy coupled with cyclophosphamide and steroids sufficiently to allow a mastectomy to be done. In virtually all cases operated on, skin grafting is essential and, in the absence of radiotherapy, local recurrence is a problem.

*Stomach*

The variations in incidence of gastric carcinoma are considerable throughout Africa, although not as dramatic as for oesophageal

cancer. The disease is common in the West Lake Province of Tanzania (Burkitt *et al*), Rwanda and Burundi (Burkitt, 1973) and urban South Africa (Cook and Burkitt, 1971), but of low incidence in Kampala, Lourenco Marques and rural South Africa (Cook and Burkitt, 1971).

In this series it was the second commonest tumour in men after oesophageal cancer, whereas only three cases occurred in women. Undoubtedly there is a considerable under-diagnosis of this disease, which is helped by there being no radiologist in Botswana and only three hospitals with facilities for screening barium meals.

It is worth noting that, in the author's experience, gastric ulcer is rare among the Botswana, whereas duodenal ulcer is not uncommon.

Late presentation was again a feature of the gastric cancer cases seen. Only one case of the 11 was suitable for a curative resection, and palliative resections could only be done in three others.

#### *Malignant Melanoma*

Malignant melanoma is said to be common in Africans, and to present later than in Europeans (Gordon, 1973), although Kiryabiwe and his colleagues (1968) recorded a lower incidence of the disease in Uganda than in Europe and the United Kingdom. The commonest site of the presentation is on the sole and heel in Africans as against the limbs and trunk in Europeans (Gordon, 1973).

Trauma has been implicated as an aetiological factor in Africans, but malignant melanoma occurs on the sole in American Negroes wearing shoes, and no evidence of trauma as an aetiological factor in malignant melanoma could be found in a study of the feet of Zulu "Ricksha boys" in Durban whose feet are subjected to a high degree of trauma as a result of their work (Bentley-Phillips and Bayles, 1972). It has been postulated that this high incidence of melanoma on the foot in Africans is due to the presence of ectopic, potentially unstable collections of melanocytes in that area which may be genetically determined (Lewis, 1967).

Of the nine melanomas seen in this series, five occurred on the sole of the foot, one on each finger, cheek and thigh, and, in one case the primary site was not recorded. All the cases of melanoma on the foot had large tumours and secondary deposits in the inguinal nodes at the time of presentation.

#### *Hepatoma*

Primary liver cell carcinoma is probably one of the commonest tumours encountered in sub-Saharan Africa (Burkitt, 1973; Gelfand *et al*, 1972; Oettle, 1967; Robertson *et al*, 1971). This sidespread frequency has only recently become apparent with the more extended use of needle biopsy for histology (Burkitt, 1973).

In this series eight cases were diagnosed, seven in males making it the third commonest tumour in men. Needle biopsies are not done in Botswana, diagnosis being made on a biopsy obtained at laparotomy. Due to the late presentation of these cases, all of which had gross hepatomegaly when first seen, it is likely that cases seen outside Gaborone are diagnosed on clinical grounds, and not all referred. In none of the cases seen was any surgical treatment possible, because of the gross involvement of both lobes of the liver.

#### *Penis*

The incidence of carcinoma of the penis is related to circumcision and personal hygiene. In those areas of East Africa where circumcision is practised, the incidence of penile carcinoma is low (Cook and Burkitt, 1971). Circumcision in infancy is said to virtually eliminate the risk of penile cancer (Bhana and Kyalwazi, 1972).

Circumcision is not practised routinely among the Batswana and standards of hygiene are generally low. Consequently penile carcinoma was one of the more common tumours in men, equal third with hepatoma and prostatic carcinoma. Late presentation was again common, one man presented with nothing but a fungating ulcer in the perineum with complete destruction of penis, scrotum and testicles.

#### *Kaposi Sarcoma*

This sarcoma is peculiar to Africa, and is one of the more commonly occurring tumours in many series (Cook and Burkitt, 1971). However, the incidence is variable ranging from 0.4 per cent. in Tunisia to 12 per cent. in the Congo, with intermediate figures of 5.4 per cent. for Uganda, 3.3 per cent. for Rhodesia, and 1.5 per cent. for South Africa. (Kyalwazi, 1972).

No cases were recorded in this series, although the author has seen two cases at other hospitals in Botswana during the last four years. Botswana is, probably, one of the countries with a low incidence of the disease.

*Bladder Cancer*

This disease is common in Malawi and around Lake Victoria, but has a low incidence in the highlands of both branches of the Rift Valley. There is evidence for an association between the occurrence of urinary bilharziasis and cancer of the bladder (Cook and Burkitt, 1971).

Only one case, and that associated with urinary bilharziasis, was recorded in this series. Botswana's semi-arid climate and lack of large areas of permanent water and running rivers is against large scale urinary bilharziasis. However, in the North West of the country around the Okavango Swamps where there is permanent water, bilharzia is common. Yet bladder cancer is not reported from these areas. Whether this is because there are few cases or the cases are just not being diagnosed has yet to be discovered.

*Large Bowel Cancer*

This disease is rare throughout Africa, a fact which may be associated with the high cellulose content of the diets and rapid bowel transit times of Africans (Cook and Burkitt, 1971).

No cases of large bowel or rectal cancer were seen in this series, and a mission doctor has reported that he has not seen a case of colonic cancer and only a few cases of rectal cancer in 25 years of practice in Botswana (Merriweather, 1972).

The diet of the rural African in Botswana is the high residue type similar to all other parts of the continent.

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