

Epidemiological Study of Carcinoma of Liver in Dodoma Region in Tanzania

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Primary hepatocellular carcinoma is a common disease in Africa, particularly in Mozambique, South Africa, Zambia, Kenya, etc. In Dodoma Region of Tanzania, the populace consumes large numbers of ground nuts which are believed to predispose to liver cancer. Of 939 clinically diagnosed malignancies in the Region during 1972-1976, 256 (27 percent) were primary hepatocellular carcinomas. An analysis of these findings is presented.

Dodoma Region is in Central Tanzania almost halfway across the country between the Indian Ocean in the East and Lake Tanzanyika in the West (Figure 1). The climate is semi-arid: hot and dry for most of the year with one rainy season. Crops are grown once a year so that grain and other foods, including vegetables, have to be stored for the rest of the year.

Initial studies on malignant disease in Tanzania were based on histological material obtained in the Tanzania Cancer Registry in Dar es Salaam covering a five-year period from 1969 to 1973. In that study, the occurrence of cancers of the alimentary system, genitourinary system, and others was analyzed and their distribution mapped.¹ Advantage was also taken of a study done by the Bureau of Resource Assessment of Land Use Planning (BRALUP), at the University of Dar es Salaam on the distribution of Health Facilities in the country including Dodoma Region. The study showed that only 7.2 percent of the total population of 709,380 in the Region was within five kilometers of a health facility, (ie, dispensary, health center, or a proper hospital). Therefore, the figure of only 35 cases proven histologically probably represented a large proportion of cases, most of which went undetected, or were never biopsied or autopsied.

These factors, combined with clinical impressions from physicians in the

area, prompted the author to select Dodoma for a study of liver cancer on the premise that its relative incidence must be high.

The aim of the study was for its practical application. Dodoma Town had been selected as the new Tanzanian capital. Secondly, there had been a number of reported outbreaks of infectious hepatitis in the area; and thirdly, ground nuts are grown and consumed in large numbers throughout the region. There was a degree of undernourishment among the young population, which further added potential risk factors.

These factors combined give the impression that the disease probably has environmental etiology and if studied carefully, baseline data will be obtained which will determine whether or not the disease will decline with migration of people and improvement of facilities in the area. There is no doubt that hygiene conditions will be bettered, and water facilities and diet improved. The opportunity therefore should be taken to study the disease before it disappears, and possibly these findings will enable physicians to pinpoint the causative factors and institute preventive measures.

Primary hepatocellular carcinoma (PHC) is a common disease in Africa, but it is more prevalent in some parts of Africa than others, for example in Mozambique and South Africa, it is seen in large numbers. In Zambia, Bayley (personal communication) has studied the disease and estimates its prevalence to be high there as well. Well-documented statistical data from

Africa are difficult to find but Bagshawe² and Peers and Linsell³ have studied aspects of the disease in Kenya.

Materials and Methods

Dodoma Region has four main hospitals which are, for all intents and purposes, district hospitals. These hospitals are Dodoma Urban, Mvumi (Dodoma Rural), Mpwapwa, and Kondoa (Figure 1). All patients who require hospitalization are admitted to one of these hospitals where there are one or more qualified physicians and assistants. The physicians are general-duty medical officers who must cope with all diseases in the locality, ranging from pediatrics to surgery.

The first objective was to find out the total number of patients who had been clinically diagnosed as having cancer in these hospitals and what percentage of these were liver cancers. Table 1 shows that 27 percent of all clinically diagnosed cancers are primary hepatic carcinomas. This is a high figure by all standards. Table 1 also shows the number of patients in each hospital diagnosed as having cancer of liver as opposed to other cancers. The next objective was to ascertain the pattern of consumption of ground nuts among the population. The patients were not given questionnaires, but were interviewed by medical students who recorded their responses.

Table 2 shows the pattern of ground nut consumption in each hospital. Fifty percent of the respondents consumed ground nuts daily and 38 percent weekly while 12 percent consumed them occasionally or not at all. Therefore, 88 percent of the general population are regular ground nut consumers. The pattern of consumption in each district, as represented by the hospitals, is shown also in Table 2.

The kind of ground nut consumed

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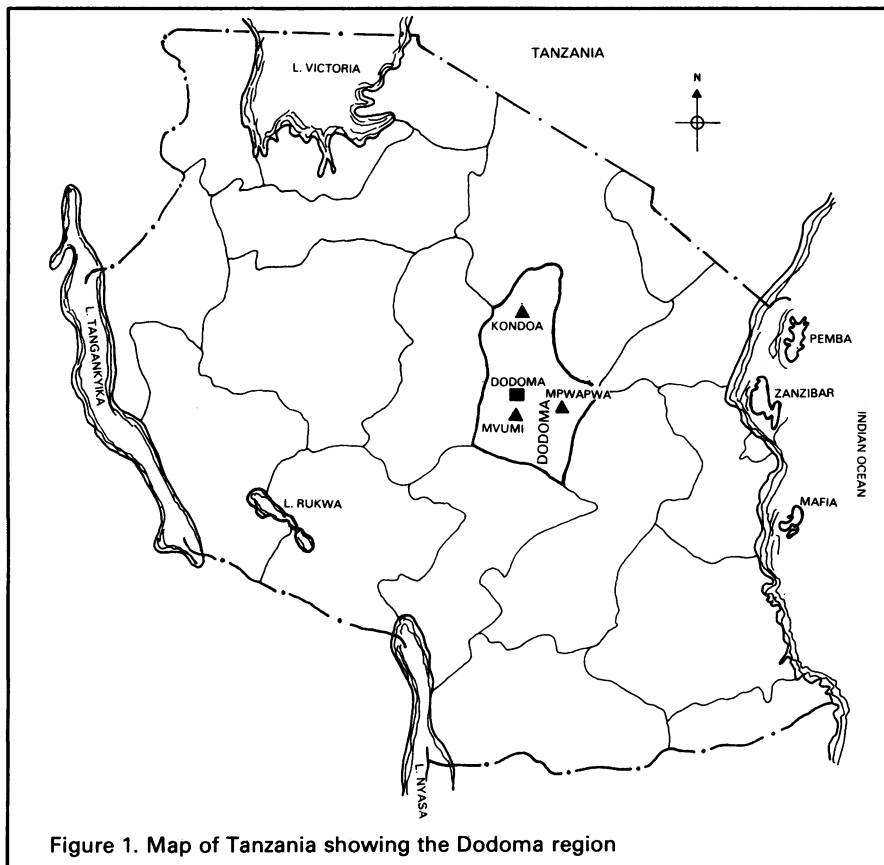


Table 1. Total Cancers Diagnosed in Relation to Liver Cancer in Dodoma Region, 1972-1976 (All by clinical diagnosis)

Hospital	Liver Cancer Number (Percent)	Other Cancers Number (Percent)	Total
Kondoia	16 (24)	50 (76)	66
Mpwapwa	33 (34)	65 (66)	98
Mvumi	95 (22)	334 (78)	429
Dodoma	112 (32)	234 (68)	346
Totals	256 (27)	683 (73)	939

Table 2. Total Number of Ground Nut Consumers in Each Hospital

Hospital	Weekly or Daily Consumption Number (Percent)	Occasional or Nonconsumers Number (Percent)	Total Respondents
Kondoia	21 (91)	2 (9)	23
Mpwapwa	31 (100)	0 (0)	31
Mvumi	32 (86)	5 (14)	37
Dodoma	40 (80)	10 (20)	50
Totals	124 (88)	17 (12)	141

Hospital	Fresh	Dry	Cooked
Kondoa	14	17	19
Mpwapwa	26	30	28
Mvumi	29	31	30
Dodoma	32	36	35
Totals	101	114	112

Hospital	Positive History of Jaundice Number (Percent)	Negative History of Jaundice Number (Percent)	Total Respondents
Kondoa	7 (30)	16 (70)	23
Mpwapwa	15 (48)	16 (52)	31
Mvumi	18 (49)	19 (51)	37
Dodoma	24 (48)	26 (52)	50
Totals	64 (45)	77 (55)	141

	Positive History of Jaundice Number (Percent)	Negative History of Jaundice Number (Percent)	Total
Regular ground nut consumers	61 (49)	63 (51)	124
Occasional or non ground nut consumers	3 (18)	14 (82)	17
Totals	64 (45)	77 (55)	141

(Table 3) refers to whether the nuts were fresh, cooked, or stored. Just over 50 percent of the respondents consume them after storage.

A separate questionnaire was used to determine whether the respondent had ever had jaundice and about 45 percent had jaundice (Table 4).

Table 5 shows that those who regularly consume ground nuts have similarly had jaundice and 49 percent of respondents are regular consumers of nuts with a positive history of jaundice.

Table 5 also shows the regular consumers, with and without a history of jaundice, and occasional or nonconsumers with or without a history of jaundice. From this information is derived, $\chi^2=6.717$: $P<0.01$. Thus, regular consumers of ground nuts are more

likely to develop jaundice than occasional or nonconsumers.

Conclusion

What this means in terms of developing liver cancer is not yet clear. It appears definite that regular ground nut consumption tends to affect the liver in such a way as to make it more susceptible to hepatitis. This could be attributable to the presence of hepatotoxins in the nuts and other foodstuffs which damage the liver and render it more susceptible to the hepatitis virus. The hepatitis virus has yet to be identified in blood samples from the general population now under analysis for Hepatitis B antigen (HB_sAg). These results will be communicated later.

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