Oesophageal cancer in three regions of South Africa

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Summary
Cancer of the oesophagus is the commonest cancer in South African black males. The highest incidence rates occur in the south of Transkei. The rate among urban blacks, especially in Soweto, is also high. This study determined risk factors for oesophageal cancer in patients in three different environments — urban Soweto, rural Ciskei and rural-urban Bophuthatswana. Males were affected more than females. The majority of patients in all three regions were smokers. With regard to alcohol consumption, most Sowetans (84%) and Ciskeians (91%), but only 57% of patients from Bophuthatswana, were drinkers. Home-brewed drinks were the main source of alcohol. Oesophageal cancer occurs in both rural and urban environments, affects people without regard to tribal ethnicity, and occurs mainly in the 6th decade; moreover, almost all patients present with advanced disease.

Cancer of the oesophagus was a rare disease in the South African black population until the last few decades. The incidence has increased, and at present it is the commonest cancer in black males in many parts of South Africa. The highest incidence rates reported from southern Africa are those for the south of Transkei. In 1981, rates were 63/100 000 for males and 65 for females. The incidence in Soweto is also high; annual incidence rates during 1980 - 1982 for males and females were 26 and 6/100 000 (standardised to the world population), respectively. In 1986, rates for urban blacks were 28.4 and 7.8, respectively. In 1988 Jaskiewicz, using brush cytological screening of population groups in remote rural areas of Transkei, showed prevalences of 1.6 - 2.8% for malignant and 0.5 - 1.8% for moderate to severe dysplastic lesions in subjects over 35 years of age. Cancer of the oesophagus is by far the most common cause of cancer deaths among blacks. The major risk factors associated with oesophageal cancer are alcohol and smoking. The evidence suggests that any deleterious effect of these two substances occurs on a background of nutritional deficiencies of micronutrients.

With regard to diet, among urban blacks in Soweto a measure of westernisation of diet has occurred. Fat intake is habitually low (24% of energy) and fibre intake has greatly decreased (approximately 14 g daily), while consumption of animal protein, salt and sugar has increased. In rural areas the consumption of a very low-fat diet (10 - 15% of energy) is usual, dietary fibre intake is 25 - 35 g daily, and maize is still the staple. For blacks generally carbohydrate foods provide 70 - 80% of energy value, fat 10 - 20% and protein 10 - 12%. The diet is probably adequate in energy value and gross protein, low in animal protein and fat, high in carbohydrate, low in calcium, usually or frequently high in iron, and borderline or low (with exceptions in some groups) in most of the vitamins.

This study determined aspects of the geographical distribution of oesophageal cancer in three different environments of South Africa, namely urban Soweto, rural Ciskei and rural-urban Bophuthatswana.

Patients and methods
One hundred consecutive patients from Baragwanath Hospital, Soweto (1988, 1989), 110 patients from Ga-Rankuwa Hospital, Bophuthatswana (1985), and 80 patients from Cecilia Makiwane Hospital, Ciskei (1988, 1989) were interviewed. All had histologically proven oesophageal cancer. The questionnaire employed was designed to focus retrospectively on sex, age, ethnicity, habitat, alcohol intake, smoking, duration of symptoms before seeking medical advice, and initial symptoms. The site of the cancer was also noted.

Alcohol consumption. Subjects were questioned as to the type of alcohol consumed, i.e. home-brewed or Western alcoholic drinks.

Smoking. Questions were included to determine whether commercial cigarettes, hand-rolled cigarettes (in which pipe tobacco is wrapped in newspaper, brown paper or telephone directory paper), or a pipe was smoked.

The patients were interviewed by the authors (R.S., I.S., W.W.). As with all Third-World patients, it is difficult to ascertain the reliability of the data obtained from subjective questions, such as those relating to symptoms. However, with regard to alcohol consumption and smoking practices the information is regarded as reasonably valid. The schedule of questions was designed to be direct and factual. This technique has been used previously in other studies.

Although alcohol and smoking are risk factors in oesophageal cancer, it must be recognised that these practices are widespread, yet only a small proportion of the black population at risk develops oesophageal cancer. This indicates the limitations of knowledge of both predisposing and precipitating factors.

Results
Sex. The male/female ratio was similar at Baragwanath Hospital and Ga-Rankuwa Hospital (M/F = 4:1 and 3.8:1). However, the male/female ratio at Cecilia Makiwane Hospital was almost equal (M/F = 1:1:1).

Age. The mean age of development of oesophageal cancer in all three regions was in the 6th decade (Baragwanath 54 years, Ga-Rankuwa 55 years, and Cecilia Makiwane 59 years).
Birthplace. Fifty per cent of the Baragwanath patients were born in Soweto or other parts of Johannesburg. An additional 20% had lived in Johannesburg for over 40 years. Thus, 70% of patients were urbanised. Most of the patients (77%) from Ga-Rankuwa were rural; the remainder were urban dwellers. The huge majority (94%) of Ciskeian patients were of rural origin.

Ethnicity. The predominant groups among the Sowetans were Zulu 24%, Xhosa 19%, Sotho 19% and Tsswana 17%. At Ga-Rankuwa the Tsswana group predominated (31%), followed by Sotho 19%, Swazi 6%, and Zulu 8%. All patients at Cecilia Makiwane Hospital were Xhosa.

Alcohol. The vast majority of patients at both Baragwanath and Cecilia Makiwane Hospitals were drinkers (84% and 91%, respectively). In the Ga-Rankuwa series, 57% were drinkers. Home-brewed beer made from cereal was the drink most usually consumed in all three regions.

Smoking. Most of the patients were smokers; 88% at Baragwanath, 70% at Ga-Rankuwa, and 93% at Cecilia Makiwane. Hand-rolled cigarettes were smoked by 42% of patients at Baragwanath, 18% at Ga-Rankuwa, and 33% at Cecilia Makiwane. Ciskei was the only area where pipe smoking was fairly common (49.9%).

Duration of symptoms, i.e. date from the onset of the patient’s appreciation of symptoms. Sowetan patients came to hospital earlier than their Bophuthatswana and Ciskeian counterparts. The mean times of appreciation of symptoms were 6 weeks, 4 months and 3.7 months, respectively.

Symptoms. Dysphagia and vomiting were the initial symptoms in most Sowetans (61% and 17%). At Ga-Rankuwa, dysphagia and coughing were common (96% and 60%). However, at Cecilia Makiwane, epigastric pain and sore throat were the commonest symptoms (26% and 25%).

Site. The commonest site of cancer was the mid-oesophagus (53% at Baragwanath, 46% at Ga-Rankuwa and 61% at Cecilia Makiwane). The next commonest site at Baragwanath and Ga-Rankuwa was the lower oesophagus; at Cecilia Makiwane, however, it was the upper oesophagus.

Discussion

Doll considers that the study of the geography of disease was one of the principal means by which clues to aetiology were obtained in the last century, and that it led to the discovery of the causes of many parasitic and infectious diseases, and of vitamin and trace element deficiencies. Geographical pathology enables an investigator to perceive disease in a wide perspective, and to identify possible common aetiological factors that occur in widely disparate geographical regions, rather than solely looking at disease in a localised area.

The study reports indicated that in the three regions, the majority of oesophageal cancer patients were smokers. Most were cigarette smokers, but an appreciable number smoked hand-rolled cigarettes, using pipe tobacco and paper. This is in accord with the earlier observations of Segal et al., who found there to be an elevated risk associated with the smoking of pipe tobacco.

Previous case-control studies in South Africa have shown an elevated risk for the smoking of pipe tobacco and more recently for the smoking of cigarettes, but no evidence for an independent risk associated with the consumption of alcohol. However, a population survey conducted in areas of high and low incidence in Transkei suggested that a combined effect of smoking pipe tobacco and drinking may be of importance.

With regard to alcohol consumption there is a disparity in the incidence of drinking in the three regions. Most Sowetans (over 80%) and Ciskeians (90%), but only 57% of patients from Bophuthatswana, were drinkers. The type of alcohol consumed was mostly home-brew.

In Europe and North America, alcohol and tobacco use have been identified as agents in the causation of oesophageal cancer. Among drinkers and smokers, the risk rises considerably more sharply with rising alcohol consumption than with rising tobacco consumption. Much of the geographical distribution of oesophageal cancer for males in Europe and North America can be explained in terms of alcohol consumption. The fact that only 57% of patients at Ga-Rankuwa drank alcohol is not consistent with the findings on patients in the Western world. This suggests that alcohol consumption could be obfuscating the more basic aspect of the aetiology of the disease. Moreover, throughout China, Soviet central Asia and northern Iran, alcohol and tobacco play a negligible role in determining the geographical pattern of the disease. In southern African populations, it is fair to conclude that the principal carcinogenic stimulus comes from tobacco, and especially from pipe tobacco, smoked either in pipes or in hand-rolled cigarettes.

The study of Segal et al. suggests that the consumption of beer made from maize is a factor in the development of oesophageal cancer in Africa. Other evidence supports this view. This is consistent with the ‘obfuscating’ theory mentioned above, because the weight of present evidence suggests that adverse sequelae may be mediated through nutritional deficiencies, and also through the direct impact of a chemical carcinogen; however, even soil types may be involved. Other features evident from the investigations carried out are that the cancer occurs in both rural and urban environments, affects people without regard to tribal affiliation, and occurs mainly in the 6th decade. Males are more frequently affected than females, although the sexual bias is less apparent in Ciskei. In the adjacent Transkei, male bias is marked.

Urban patients come to hospital earlier than their rural counterparts, perhaps reflecting the availability of better facilities in Soweto. Dysphagia was the common presenting symptom in patients in Soweto and at Ga-Rankuwa, but epigastric pain and sore throat were the commonest symptoms in Ciskei. It is unfortunate that whatever the presenting symptoms may be, most patients seek help with advanced disease, and their prognosis is uniformly poor. Walker et al. found that 50% of patients who had died after approximately 4 months, and Lazarus and Venter found that less than 1 patient in 3 was alive 3 months after presentation. This contrasts with the situation in China, where mass cytological screening of the population has been performed over the last 25 years, and where 574 patients with oesophageal cancer were detected; 474 were at stage 1, and the 5-year survival rate after resection was 90%. It is hoped that this limited study will encourage others to undertake more national and in-depth studies of the geography of disease. If the incidence of oesophageal cancer is to be decreased, the nutritional status of the undernourished must be improved and the dangers of drinking alcohol, particularly home-brew, and of smoking, particularly hand-rolled cigarettes, must be clearly publicised. However, improvements in nutritional status are likely to be slow in the present socioeconomic situation. Smoking and drinking are likely to increase. However, as shown by Jaskiewicz et al., cytological screening of the oesophagus would be very difficult to implement even on a regional scale. Accordingly, the outlook in respect of the control of this common cancer is unpromising.

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REFERENCES


