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HABITS AND CUSTOMS AS CAUSATIVE AGENTS OF CANCER

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Cancer is a world problem. It has been known to occur in all races of man in which it has been investigated. Since the inception of the Tata Memorial Hospital, we have had much experience with the occurrence of this dreadful disease. An early and consistent observation was that cancers in some regions of the body are encountered more frequently in some races and communities than in others. Thus, for instance, cancer of the oropharynx is our main health problem in India. More than half the cancers in Japan are gastric cancers and skin cancer, which does not occur so commonly in the pigmented peoples, is seen often in the white Australians. An analysis of the first 10,000 cases of the Tata Memorial Hospital convinced us of two facts (1) that the high incidence of cancers of certain sites could lie in the habits of the people and (2) that significantly large population groups had to be surveyed to state emphatically such a correlation between a habit peculiar to a people and the high incidence of a given cancer. This is the topic I wish to digress upon a little today—and outline for you in brief the laborious task that has engaged us for many years—to prove that habits, customs and usages can serve as causal agents for cancer.

BUCCO-PHARYNGEAL CANCER

In most parts of India and Ceylon, the number of persons suffering from cancer of the mouth and oropharynx far exceeds those afflicted by cancer of any other part of the body. This is particularly striking in the case of men. In a study of 2,000 consecutive cancer patients in Bombay during a period of 11 months, almost half (877) presented cancer of the mouth and the adjacent portion of the pharynx. The distribution of some of the principal sites in this region of the upper alimentary tract was as shown on the next page.

It has been observed that there is a peculiar localization of bucco-pharyngeal cancer in different geographical regions of India, and also in different communities in the same locality.

Site	Percentage of bucco-pharyngeal cancer
Base of the tongue	25
Hypopharynx	21
Buccal Mucosa	13
Tonsil	13

Cancer of the lower lip (Khaini cancer)

Cancer in this form is seen frequently in Bombay (Khanolkar and Suryabai 1945), but in Bihar and the adjacent areas of Uttar Pradesh it is found to be the most common variety of malignant diseases in the mouth.

TABLE I

Place	Oral cancer	Lip cancer with alveolus
Bombay 1941-45	2,326	115 (4.94)
Patna, Bihar 1944-46	1,156	661 (57.11)

The figures in parentheses represent percentages of lip cancer relative to total oral cancer.

This remarkably high incidence is associated with the habit, particularly in men, of sucking, slowly, a mixture of tobacco and lime. The habit is common in the poorer people who rub with the right thumb a powder of dried tobacco and slaked lime in the palm of the left hand until the desired mixture is obtained. This mixture (*khaini*) is then deposited in small amounts and at frequent intervals, during the day, in the lower gingivo-labial groove and gradually swallowed after dilution with saliva.

Cancer of the mucous lining of the cheek

Cancer of the mucous lining and the adjacent gingival groove overshadows all other types of oral cancer in the south-western coastal regions of India and Ceylon. The relative incidence decreases from south to north reaching a maximum in Ceylon and Travancore.

This type of cancer is believed to follow the habit of betel leaf and betel-nut chewing, but it is doubtful whether the usual constituents of betel (*pan*)

play any rôle in its connection. In Indonesia, cancer of the cheek is extremely rare, although the Javanese, particularly in rural areas, chew betel leaf and sliced betel nut continuously. Balendra (1946) noticed that of the 246 patients addicted to this habit and observed by him at the Dental Institute, Colombo, during the previous 20 years, none developed oral cancer after they had submitted themselves to adequate dental treatment and followed simple rules of oral hygiene, even though they continued the habit of chain betel chewing.

A survey of 10,000 men over the age of 30 years to determine their tobacco chewing and smoking habits, with or without betel leaf and nut, and the influence of these habits on the development of pre-cancerous changes in the mouth has provided some interesting information. It appears that betel chewing, far from causing cheek cancer, probably inhibits its development.

TABLE II

Chewing habit	Smokers		Non-smokers	
	Number	With oral* signs	Number	With oral* signs
Tobacco only ..	112	52 (48.2)	1,148	454 (39.7)
Tobacco with betel ..	990	186 (18.8)	2,352	300 (12.8)
Non-addicts ..	3,777	1,165 (31.0)	1,617	287 (14.0)

* Oral signs refer to pre-cancerous conditions.
The figures in parentheses represent percentages.

In Bombay city, cheek cancer is seen more commonly in Deccani Hindus, who work mainly as gardeners, millhands, stevedores and policemen. Their habit of chewing tobacco, with or without betel, and of keeping the cud in the cheek for several hours is very common. Where the rules of work prevent smoking while on duty, as in the case of policemen, it is common practice to chew tobacco. The association of this habit with the production of cancer is probably dependent on other ancillary factors such as poor oral hygiene, malnutrition and the lack of adequate vitamin B complex in the diet (Waravdekar, Mangaonkar and Khanolkar 1950). It seems likely that the variety of tobacco, the soil in which it is grown and the method of its curing determine largely the changes in the oral mucosa. Thus the people of Ceylon chew mainly the Jaffna tobacco; the people of Travancore chew the Jaffna and Menapalayan (Vaddakan) variety, whereas in Bombay the Neevani variety is commonly used.

Cancer of the palate (Chutta cancer)

In the mid-eastern coastal regions of India (Andhra State) cancer of the hard palate appears to be fairly common.

This type of cancer is associated with the habit of the reverse smoking (*adda poga*) of a cigar (*chutta*) with the burning end inside the mouth. The high incidence of palate cancer in Andhra is probably associated with an exposure to probable carcinogenic substances from the burning tobacco, and the heat generated in the vicinity of the live end of the *chutta* or cigarette.

Cancer of the base of the tongue and tonsil

Cancer of this type is more than twice as common in Gujarati Hindus as in the Deccani Hindus in Bombay.

The Gujarati Hindus are particularly addicted to smoking local cigarettes (*bidi*) made by rolling tobacco flakes in a dried leaf of a variety of *Bauhinia* or *Diospyros*. A study (Sanghvi, Rao and Khanolkar 1955) of 1,460 consecutive patients with oral cancer who attended the Tata Memorial Hospital, Bombay, during 1952-54 is suggestive. It appears that cancer of the base of the tongue and hypopharynx is associated with the combined habit of smoking *bidis* and chewing tobacco. The marked preponderance of this type of cancer is shown in Table III.

TABLE III

Cancer of the Base of the Tongue and Tonsil in Males in three Communities
—Tata Memorial Hospital, Bombay, 1941-45

	Oral cancer	Cancer of base of tongue	Cancer of tonsil
Deccani Hindus ..	418	148 (35.4)	57 (13.6)
Gujarati Hindus ..	601	354 (58.9)	121 (20.1)
Muslims ..	440	198 (45.0)	65 (14.8)

The figures in parentheses represent percentages of tongue and tonsil cancer relative to total oral cancer.

The total attendance at the hospital of the Deccani Hindus compared to Gujarati Hindus during this period was in the proportion of 3 : 2. It is seen that cancer of the base of the tongue and tonsil is more frequent in Gujarati Hindus than in Deccani Hindus. Cancer of these organs in Bombay Muslims occupies an intermediate position, as most of them are converts from Gujarati or Deccani Hindus and still retain the language and many of the habits of the people from whom they originated.

CANCER OF THE SKIN

It has been pointed out that cancer of the exposed parts of the skin (face, ears, hands and so on) is much less frequent in pigmented races than in fairer people living in the same locality (Puente Duany and Fonts Abreu 1948). In Southern India this variety of cancer does not constitute more than 2 per cent of all cancers. In the more lightly pigmented people in tropical countries it is more than 10 times as frequent, particularly in persons who are exposed to wind and sun in the performance of their daily work.

There are two types of cancer of the unexposed part of the skin which are peculiar to India and which are associated with particular customs.

Kangri cancer

The people of Kashmir keep warm by carrying outside, and often under their long shirts, an unglazed earthen pot packed with smouldering dry maple (chinar) leaves. The earthen pot is covered with a basket of reeds and is either suspended from the neck or held in the hand. In men the use of the Kangri leads to a severe erythema of the skin covering the abdomen and the inner surface of the thighs during the early winter months. In women the erythema spreads to the pudendal regions and the lower surface of the breasts. With the coming of spring the erythema subsides, except in a small number of people in whom a mild eczema persists for several months. Neve (1900) and Neve (1924) observed a prevalence of squamous-cell cancer of the skin of the lower abdomen or the thighs in the people of Kashmir and associated its occurrence with the use of Kangri and the skin burns frequently caused by it. It is doubtful whether the presence of these mild burns affords the entire basis for the causation of this cancer and it may be necessary to study the action of probable carcinogenic substances in the smoke of chinar leaves, and the altered competence of epidermal cells subjected to recurrent inflammatory changes every winter.

Dhoti cancer

In most parts of India a piece of cotton cloth is worn to cover the lower part of the body. This cloth, which for men is called the dhoti and for women is called the sari, is tied tightly round the waist with one of the shorter ends carried under the groin and tucked at the back. The poorer people are obliged, through economic necessity, to work, sleep and bathe with the dhoti firmly attached to the loins. The method of wearing this garment is followed after many years by patches of depigmentation, glazing of the skin, acanthosis and, occasionally, carcinoma of the skin of the loin or groin.

CARCINOMA OF THE PENIS

Low incidence in circumcised races

Phimosis and cancer of the penis are almost non-existent in Jews and are relatively rare in Muslims, primarily because circumcision is an essential ritual in these faiths. On the other hand in the uncircumcised Hindus and Chinese it is a frequent disease. The incidence is low in most Western countries (1.25 per cent of all malignant tumours in the male), while it rises to about 5 per cent in some central European countries and Spain (Dean 1935; Sauer and Leighton 1944) and to 8 per cent in Vietnam (Joyeux and Nguyen 1950). The relative infrequency of this type of cancer in circumcised persons has often been commented upon and has been reviewed by Kennaway (1947). His conclusions agree with the findings in Bombay, where no such cancer was encountered in the Jews who constitute roughly about 0.5 per cent of the population. In the first 10,000 patients examined at the Tata Memorial Hospital there were only 2 instances of this cancer in Muslims as against 86 in Hindus. The attendance of the Muslim to Hindu males during the period was roughly 1 : 3.

In assessing the importance of circumcision in its prevention of penis carcinoma, the age at which the operation is practised and the thoroughness with which it is performed must be considered. In the performance of a ritual, considerations other than anatomical play an important part and, even though the age for circumcision may have been prescribed by religious canon, its observance shows considerable latitude in the Muslims. In many parts of India the ritual is usually performed before the age of 6 years. In Indonesia the usual age for circumcision is between 8 and 14 years and in a large number of children it is performed by the indigenous medicine man, Dukun. Kouwenaar (1933) has referred to the existence of cancer of the penis in circumcised Javanese and its greater frequency in the Chinese who have settled in Indonesia. The disease was frequently seen in the Indo-Chinese in North Vietnam.

CANCER OF THE BREAST

Cancer of the breast is not seen as frequently by us in India as in most of the Western countries. For instance, at the Tata Memorial Hospital it accounted for 7.4 per cent of all cancer cases as against 16.2 per cent at the Memorial Hospital in New York and 16.6 per cent at the London County Hospitals. However, cancer of the breast appears to be the second commonest type of cancer in Indian women. In an analysis of the first 10,000 cases at the Tata Memorial Hospital there were 655 women with cancer of the cervix uteri and 428 with cancer of the breast. A careful study of the distribution of this type of cancer according to communities revealed an interesting fact that it was much commoner in Parsi women than in the different groups

of Hindu women. In Bombay city there are roughly 30 Hindus to 1 Parsi. The frequency of cancer of the breast, however, as observed by us was approximately 3 in Hindus to 1 in Parsis in the patients attending our hospital. In other words, 10 times more cancer of the breast was seen in Parsis than could be expected on a population basis of the city. It would be further seen that during the 5 years 1941-45 the frequency of breast cancer in Parsi women was 49.2 per cent of all cancer and only 15.8 per cent in Hindu women. In the case of Muslim and Christian women the frequency was in between these two figures and represented 23.6 per cent and 27.8 per cent respectively. Cancer of the breast occurred at a slightly earlier age in Hindu women than in the Parsis. Thus, for instance, the highest incidence in Hindu women was in the age group of 40-49 and in the Parsi women between 50-59 years. As is well known, in Western countries the highest incidence of breast cancer is usually between the ages of 45 and 59. These findings naturally attracted our attention and we have been studying the probable causes for these marked differences in the frequency of breast cancer in the different communities. We believe that the following considerations may play an important rôle in the production of these differences.

The ancestors of the Parsis migrated to India from Iran many centuries ago. They have tried to carefully maintain the religious observations and inhibitions which they brought with them to India. They form a small but well-knit community which tries to keep intact by marrying only between themselves. Close inbreeding is very prevalent amongst them and it is believed that this has accentuated the incidence of certain diseases in them. The Parsis have mainly taken to business and are economically a much higher group than the Hindu population.

It was observed that the Parsi women on an average marry 10 years later than the Hindu women. A study of the marital status and the number of children in our breast cancer patients, according to communities, revealed that almost one-third of the Parsi group was unmarried, whereas in the case of Hindu women this proportion was hardly 2 per cent. It was also observed that the proportion of Parsi women with more than 3 children was much smaller than that for the Hindu women. We, therefore, believe that late marriage, fewer children in married women and late and scanty lactation with continued retention of breast secretions contribute towards the production of breast cancer in these women more so than in Hindu women in whom the opposite conditions prevail.

Thus in the last few minutes I have put before you some of our ideas on the provocation of human cancer by man's own environment. Today all research, basic and applied, is geared to the availability of powerful tools. I want to emphasize, rather gently no doubt, to a gathering like this, a simple scientific thought first enunciated by John Hunter. That doyen of British

surgeons always held that detailed observation and the sifting of facts yielded much knowledge about human disease, its causes and nature. Following of these precepts in our investigations over the last few years has, you will all agree with me, yielded a rich harvest indeed.

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