

## A STUDY ON 120 CASES OF CANCER CERVIX IN SOUTH EASTERN RAILWAY WITH REFERENCE TO EPIDEMIOLOGY AND CAUSATION

by

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Many studies have been conducted on the incidence, epidemiology and aetiological factors responsible for Cancer Cervix in foreign countries and also in India (Logan, 1953; Dorn, 1955; Wynder *et al*, 1954; Khanolkar, 1958; Terris and Oalman, 1960; Stern and Dixon, 1961; Brit. Med. J., 1964; Elliot, 1964; Dass and Mukherjee, 1961; Malhotra, 1971; Das, 1970; Jussawalla, 1973).

In the present communication, 120 cases of cancer cervix, detected in South Eastern Railway during the ten years period from January, 1966 to December, 1975, have been analysed with reference to incidence among different provincial communities, socio-economic status, clinicopathological considerations and possible aetiological factors. This study becomes useful because the Railway has a precisely defined population of known socio-economic groups and different provincial communities living in the same townships under identical environmental conditions, only differing in religious, cultural and food habits.

To the best knowledge of the author, report of an exactly identical study is not available in Indian Literature.

### Materials and Methods

(a) *Registration of cases:* The South Eastern Railway runs through 6 states of India, e.g., Bengal, Bihar, Orissa,

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Andhra Pradesh, Madhya Pradesh and Maharashtra. It has a network of 72 health units and 15 hospitals and headquarters hospital at Garden Reach, Calcutta, is the reference centre, having consultants in gynaecological and cancer surgery. The Railway provides absolutely free medical service to its employees and dependents including unmarried/widowed sisters and widowed mothers. It also includes free treatment in Chittaranjan Cancer Hospital of Calcutta where all these cases are referred. Any case detected or suspected in peripheral hospitals is referred to the Central Hospital at Calcutta for histological study (done only in this hospital) and treatment by cancer surgeon or for specialised treatment in Chittaranjan Cancer Hospital. As the treatment of cancer is very costly and the Railway bears all the expenses, it is unlikely that any case has been missed.

(b) The cases were analysed in respect of incidence according to broad provincial communities, socio-economic status and predominant clinical presentation.

(c) Exact history of parity and age at marriage were available in 60 cases and these were compared with 60 matched healthy controls.

(d) Histological study was possible on 102 cases. For coding, the histologic classification suggested by American Cancer Society in its manual of tumour nomenclature and coding, 1968 edition has been employed.

(e) Results of treatment were not

analysed as most cases were lost to follow-up after they were referred to cancer hospital.

#### Observations

Table I shows the population at risk in South Eastern Railway and its socio-economic status. The number of female population of all ages is 4,22,550 while the number above the age of 18 is 1,96,845.

The percentage distribution of all cases of female genital malignancies have been shown in Table II. Coding has been done

according to nomenclature of American Cancer Society, 1968.

Table III shows the percentage incidence of Cancers of Cervix, breast and ovary according to decreasing order of frequency and the crude incidence rate per 1,00,000 female population of all ages.

Table IV shows percentage distribution of cervical cancers in the employees and/or families of well defined socio-economic groups of officers, class III and class IV and their distribution according to broad provincial community of Bengalees, South Indian (95% belonging to

TABLE I  
Population at Risk in S.E. Railway and its Socio-economic Status

Status	Monthly income	No. of employees	Total No. of family members	% of total population
			Total Population	— 9,32,550
			Males	— 5,10,000
			Females	— 4,22,550
Officers	More than Rs. 1000.00	1,088	5,440	0.5
Class III	Rs. 300-700.00	79,297	3,96,485	42.3
Class IV	Less than Rs. 200.00	1,06,125	5,30,625	56.9

TABLE II  
Percentage Distribution of New Cases of Female Genital Malignancies by Primary Site

Int. List No.	Primary Site	Number	Per cent
140-209	All Sites	379	100.0
180-184	Female genital organs	161	42.0
180	Cervix uteri	120	31.6
181	Chorionepithelioma	3	0.7
182	Uterus—other	9	2.4
183	Vagina, vulva	27	7.1
184	Ovary	2	0.5

TABLE III  
Percentage Incidence of Cervix Uteri, Breast and Ovary and the Crude Incidence Rate per 100,000 Female Population

Sl. No.	Int. List No.	Site	Percentage	Crude incidence/100,000
1	180	Cervix uteri	31.6	28.3
2	174	Breast	16.9	15.1
3	183	Ovary	7.1	6.3

Andhra Pradesh) and other heterogeneous communities of Oriyas, Biharis, Maharastrians and practically people of all provinces of India. Approximately each of these three broad communities represents 33% of the total population, but detailed figures are not available.

Table VI depicts mean of age at marriage and number of children in 60 patients matched with 60 healthy controls. The mean age at marriage in patients is significantly lower (16.2) than in controls (19.4) and the P value is  $< 0.001$ , while there is no significant difference in the

TABLE IV

Percentage Distribution of Cervical Cancers According to Socio-economic Class and Broad Provincial Community

(Total cases—120 = 100%)

Socio-economic Class No. & (%)			Provincial community No. & (%)		
Off.	III	IV	B	S.I.	O
2 (1.6)	40 (33.3)	78 (65.7)	30 (25.0)	55 (45.8)	35 (29.2)

B = Bengalees,  
S.I. = South Indians,  
O = Other communities.

Table V shows the relation of 120 cases of cancer cervix to different age groups and the percentage distribution in each.

number of children in the two groups.

TABLE V

Percentage Distribution of Cancer Cervix According to Age Groups

(Total cases—120 = 100%)

Age groups in years	Number	Per cent
0-9	x	x
10-14	x	x
15-24	3	2.5
25-44	64	53.3
45-64	52	43.3
65 and above	1	0.8

### Symptoms

The 3 most common symptoms were irregular vaginal bleeding (90%), blood stained vaginal discharge (80%) and some sort of vague pain in abdomen and backache (50%). 15% patients came with severe anaemia and cachexia.

### Clinical Staging

There were 3 cases in Stage 0, 10 in Stage I, 25 in Stage II, 60 in Stage III and 18 in Stage IV. In 4 cases staging was not known.

TABLE VI

Mean of Age at Marriage and Number of Children in 60 Patients of Cancer Cervix and 60 Healthy Controls

	Age at marriage (years)		No. of children	
	Patients	Controls	Patients	Controls
Mean	16.2	19.4	4.73	4.21
S.E. $\pm$	0.5286	0.781	0.4572	0.3072
		t = 7.09		t = 1.15
		p < 0.001		1.0 > p < 0.5
				Not significant

### Histological typing

Microscopic confirmation was made in 102 cases (Percentage of confirmation—85%). Two types of cancer were observed, i.e., Squamous Cell Carcinoma in 100 cases (98%) and adenocarcinoma in 2 cases (2%).

### Discussion

The incidence rates of cancer cervix vary not only from country to country but also in the same country from group to group. Its incidence has shown to be markedly lower in Jewesses (Dorn, 1955) and in Indian Muslims and Parsees (Wynder *et al* 1954, Khanolkar, 1958). These differences suggest that environmental factors may play some role in the genesis of this disease.

Though there has been a remarkable drop in the incidence rate of cancer cervix in Britain (Boyd and Doll, 1964), in India, this is still the commonest malignancy in the female genital tract and commonest of all malignancies in females. In the present series, 161 malignancies of the female genital tract were encountered during the period under study out of a total number of 379 in females (Incidence—42.5%). Out of these, cervical cancers were 120, i.e., 47.5% of all malignancies in the female genital tract and 31.6% of all malignancies in females. Das (1970) from Assam also got similar results in 250 cancer cervix out of 297 female genital malignancies. In Bombay cancer registry, cancer cervix was commonest malignancy in females (Jussawalla, 1973). In our series there were 4 cases of carcinoma of body of the uterus, 3 were adenocarcinoma and 1 was squamous carcinoma. This is rather a high figure for Indian literature as Das (1970) got only 3 cases of adenocarcinoma of

body of the uterus out of 297 cases. Both in our series and in Bombay Cancer Registry cancer cervix and cancer breast occupy first two places of female malignancies. In the present series the crude incidence rate of cancer cervix per 100,000 female population of all ages is 28.3 but the incidence amongst females of reproductive and post menopausal group is 60.9 which is indeed a high figure.

Regarding the age incidence the maximum number in our series was between 25 to 44 years (53.3%) and to be precise between 31-44 years. 43.3% belonged to 45-64 years group. Our findings are in agreement with Das (1970), Naidu (1961) and to some extent with Paranjothi (1961). Our population above 58 years is limited, as the age of retirement is 58 years but we got few cases above 58 in widowed mothers of the employees. Nevertheless, incidence of cancer cervix above 65 in our country is low. We got only 1 case and Das (1970) in an analysis of the general population of Assam found only 3 cases.

Histologically, we got 98% squamous carcinoma and 2% adenocarcinoma. This is in agreement with most figures (Das, 1970; Ahuja and Reddy, 1963; and Subhadra Devi and Prabhavathi, 1961).

Regarding clinical staging, our finding is in consonance with Das (1970). Most of our cases belonged to stage III and IV, where nothing useful could be done. The factors of ignorance illiteracy and poverty may be responsible for this advancement before detection, even though Railway gives much better facilities for treatment. We had 3 cases of carcinoma in situ because of a deliberate screening of 3,000 females attending out-patient's department in connection with a Project. Das (1970) had no case of carcinoma in

situ while Ahuja and Reddy (1963) got only 6 out of 3,081 cases.

Of the various aetiological factors postulated in the causation of cervical cancer, the chief ones are low socio-economic status, early marriage, extra-marital relations, coitus at an early age, frequent coitus and poor penile hygiene. Some of them have been questioned but the only associations which are not in dispute are a history of early and frequent coitus or both and penile hygiene of the male partner (Brit. Med. J., 1964; Elliot, 1964). As the Railway has precisely defined socio-economic groups according to different categories of staff, such study has got more value as compared to those on general population. The present study shows that 99.2% of cases belonged to class IV and class III categories, i.e., low and low middle income group. Of course, it has to be admitted that these two groups comprise 99.5% of the Railway population. Das (1970) analysing cases from general population of Assam found that all his cases belonged to low and middle income group.

Study on the incidence amongst different communities shows that it is highest in South Indians (45.8%) than in Bengalees (25.0%), though each of these broad communities represent 33% of the total population of this Railway. It is seen that South Indians are nearly twice as prone to develop cervical cancer as the Bengalees though the environmental and socio-economic status of these communities are the same. This is a striking and interesting observation which appears something more than a mere chance and requires careful further study.

Our study on 60 cases matched with 60 healthy controls showed that age at marriage, which denotes age of first coitus is significantly lower in cancer patients as

compared with the controls (Table VI). Malhotra (1971) also got identical results.

The frequency of carcinoma cervix among patients having early marriage, divorced women or women having re-marriage all point to one thing, i.e., frequent coitus. Frequent child bearing was at one time thought to produce carcinoma cervix. However, the disease has been shown to be twice as common in married infertile women as in married women with children (Elliot, 1964). So, this cannot be a cause. The present study as well as those of Malhotra (1971) and Das (1970) did not show significant relationship with parity. Malhotra (1971) observed that the frequency of sex act per month in patients was significantly higher as compared to age matched healthy controls (Mean 12.43 against 3.92). He also determined pH of the semen in healthy volunteer and showed that with daily ejaculation, the pH rose sharply and became highly alkaline. The long standing effect of this alkaline milieu is hyperplasia, increased mitosis and neoplasia (Lawson, 1964; Dunham *et al* 1966; Malhotra, 1967). The same factor is in operation for increased incidence of malignancy of the G.I. tract amongst South Indians whose diets are lacking in roughage and vegetables (Malhotra, 1967).

The significantly low age at marriage amongst patients of cancer cervix, thereby having chances of early and frequent coitus in the present series supports this hypothesis. This is further supported from very low incidence of cervical cancer in nuns who abstain from sexual intercourse (Gagnon, 1950; Towne, 1955).

The above hypothesis appears very significant as with vasectomies and tubectomies frequency of sexual intercourse will rise thereby increasing the

risk of cervical cancer. In Britain the fall in cervical cancer has been attributed to use of Sheath Contraceptives, thereby preventing contact of seminal fluid with cervical epithelium (Elliot, 1964) and the great increase in U.S.A. has been attributed to use of oral contraceptive pills and unchecked free intercourse. This is a fascinating hypothesis and the present study tentatively confirms it. However, long follow-up of couples having tubectomy or vasectomy will justify its validity or otherwise. Nevertheless, this has got great implication in the national Family Planning Programme.

#### Summary

1. An aetiological and clinico-pathological analysis of 120 cases of cancer cervix detected in South Eastern Railway during the 10 years period from January, 1966 to December, 1975 is presented.

2. Cancer cervix is the commonest malignancy in females (31.6%) and commonest in the female genital tract (74.5%).

3. Crude incidence rate per 100,000 females in the reproductive and post menopausal age group is 60.9.

4. In 99% of cases the patients belonged to low socio-economic status.

5. Incidence in South Indians was highest among all communities and nearly twice as compared to Bengalees.

6. Age at marriage was significantly lower in patients but the parity did not have any significant relationship as compared to age matched controls.

7. Irregular vaginal bleeding was the commonest symptom and most cases were in advanced stage when first detected.

8. Microscopic confirmation was available in 85%. 98% were squamous cell carcinomas and 2% adenocarcinoma.

9. Frequent sexual act without any Sheath Contraception appear to be the most important aetiological factor.

10. Is cancer cervix preventable? The implication of the findings in the National Family Planning Programme is discussed.

#### Acknowledgement

The author is extremely grateful to the Chief Medical Officer, South Eastern Railway, for his kind permission to publish this report. Thanks are due to S.M.O. (Family Planning) and Deputy Chief Planning Officer for supply of the population figures, to Mrs. Lizzie Abraham, for her invaluable assistance, to Mr. S. P. Mukherjee and Mr. N. Chaudhury for the secretarial job and last but not the least to Dr. (Mrs.) Manju Kumar, M.D., D.G.O. for supply of the case notes.

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