Prevalence of Cancers in Some Parts of Madhya Pradesh and Uttar Pradesh in India

Deepak Ganjewala

College of Life Sciences, Cancer Hospital and Research Institute (CHRI), Gwalior-474 009, (M.P.), India

Abstract: Here we report epidemiology of cancer in parts of Madhya Pradesh and Uttar Pradesh. Cancer prevalence (%) in MP was almost double than in UP. However, relative % prevalence of cancers in females was reasonably higher than males. In MP, cancer prevalence (%) was reported maximum in Gwalior and Mahoba in UP. Moreover, prevalence assessed as crude incidence rate (CIR) (%) was comparatively higher in females than males in MP and UP. CIR (%) of cancers in females was highest in Morena of MP and Mahoba of UP. Study of site specific carcinoma showed that prevalence (%) of major female cancers such as cervical, breast, ovary and uterus altogether was 55% whereas for all other cancers 45%. Age wise variation in prevalence (%) of cancers was also studied. The results showed that most commonly affected people were in age group 25-50 and 50-75 years. Around ~ 41 and 51% patients were in age group 25-50 and 50-75 years, respectively. Of 41% patients in age group 25-50 years, 37% were female alone whereas in age group 50-75 years 30 of 51% were males. In MP, CIR (%) rate of cervical cancer was almost double than other female cancers while in UP it was almost similar for all types of cancers. Tobacco and diet particularly non-vegetarian were identified as major risk factors. 87% patients were non-vegetarians and 41% were tobacco chewers. Thus, the study suggests that females in age group 25-50 years are at high risks of cervix and other female cancers. Unlikely, males in age group 50-75 years are most susceptible. Also study has proven tobacco and diet as crucial risk factors for cancers in MP and UP.

Key words: Carcinoma · Crude incidence rate · Epidemiology · Prevalence · Risk factors · Tobacco

INTRODUCTION

The burden for cancer is increasing world wide despite advances for diagnosis and treatment. In the year 1990 the estimated number of cancer cases was approximately one million. Lung cancer was the leading form, followed by colon and rectal cancers, cancers of the breast, prostate and bladder, lymphoma, cancer of the uterus, pharynx and brain and nervous system, cervix, liver, larynx and thyroid gland, multiple myeloma, esophagus and testis [1]. In the year 2000, the number has been increased over 10 million world-wide including 5.3 million men and 4.7 million women. Over 6 million people died from cancers ever year. Lung cancer is the most common cause of cancer deaths in the world. Lung cancer accounts for 29% of all cancer deaths and causes more deaths than breast, colorectal and prostate cancer combined [2]. Breast cancer is the most common form of cancer and the principal cause of death from cancer among women worldwide [3]. Epithelial ovarian cancer is

the most lethal gynecological cancer among women worldwide, with 6000 new cases diagnosed in the UK each year [4]. Cervical cancer represents the fifth most common neoplasm worldwide. In India, cervical cancer is reported as the most common malignancy affecting women accounting for nearly 50% of all female malignancies [5].

Epidemiological studies in present and past have significantly contributed in our understanding about cancer associated risks factors and thus prevention of the cancers. The epidemiology of cancer is defined as study of the factors affecting cancer, as a way to infer possible trends and causes. Previously, several epidemiological studies focused on major cancers *viz.,* oral, kidney, prostate, breast, lung, esophageal have been reported [3, 6-9]. Murthy and Mathesis [10] have described epidemiology of cancers, its control and prevention measure applicable to Indian population. The major risk factors for cancers are environmental and life style factors such as tobacco, alcohol and dietary habits and

Corresponding Author: Dr. Deepak GanjewalaSchool of Biotechnology, Chemical and Biomedical Engineering,
Vellore Institute of Technology University, Vellore-632 014, Tamil Nadu, India

behavioral [11]. 25-30% of all cancers in developed countries are tobacco related [11]. The burden of tobacco related cancers in India by 2001 was nearly 0.33 million annually [1]. Epidemiological studies in India and abroad have shown that increased alcohol consumption is casually associated with cancers at various sites, mainly oral cavity, pharynx and esophagus [12]. Despite the fact that epidemiology of cancer could be valuable in cancer prevention relatively less epidemiological studies have been so far carried out. Now the scope of epidemiological studies is increasing and plenty of epidemiological studies are being conducted to examine how environmental exposure, lifestyle choices and genetic susceptibilities influence the risk of cancer. Knowledge of epidemiologic patterns and trends would be of great help in recognizing persons at high risk for the development of a particular cancer and in prevention of cancers. In view of the significance of the epidemiology of cancer in its prevention, the present study was performed at Cancer Hospital and Research Institute (CHRI), Gwalior with an objective to highlight cancer prevalence and associated risk factors in areas of Madhya Pradesh (MP) and Uttar Pradesh (UP).

METHODS

Both male and female patients from the area included in the study with cancers admitted during 1st to 30th April, 2005 at Cancer Hospital and Research Institute (CHRI), Gwalior, India was examined. The major source of information was the file of histo-pathological reports in the Biochemistry Department of Hospital. Overall, 43 patients including 16 males and 27 females were admitted during the study period.

Prevalence = incidence X duration
Crude incidence rate was calculated as follows:

$$C.R. = \frac{\text{New cases of cancer of particular year}}{\text{Estimated population of the same year}} \times 100{,}000$$

RESULTS AND DISCUSSION

Cancer Prevalence in Madhya Pradesh and Uttar Pradesh: Table 1 shows the trends of prevalence of cancer in Madhya Pradesh (MP), Uttar Pradesh (UP) and Rajashthan (RJ). Geographical area covered for MP was 11.6% of total area which includes 9.8% of total population of MP (Figure 1). For UP geographical area and population calculated were 15 % and 6.0%, respectively. In MP, cancer prevalence (%) recorded was almost two fold than that of UP. In both states M.P. and U.P., relative % prevalence of all site carcinomas was considerably high in females, though in UP female cancer prevalence (%) was much more pronounced. In U.P., females were two times more susceptible of all sites of carcinoma than males. For each patient the following data were extracted from case records sex, age, habit, life style, type of disease (based on ICD-9).

Table 2A summarizes the data of cancer prevalence in eight districts of MP. In Gwalior, cancer prevalence (%)was reported maximum, followed by Bhind (19%), Morena, Datia and Chattarpur (15% each). In other districts, cancer prevalence (%) was virtually very low. Relative % cancer prevalence in females was comparatively higher in all the districts except Morena and Chattarpur (Table 2A). Trends of cancer prevalence for UP is presented in Table 2B. In Mahoba district cancer prevalence (27%) among all the districts was reported highest. Lalitpur was next to Mahoba with reported cancer prevalence of 20%. Also, in other districts, cancer prevalence reported was considerable accounting for 13%. In UP, relative % cancer prevalence in males and females was equal except two districts Lalitpur and Banda (Table 2B). Moreover, cancer incidences expressed as crude incidence rate (CIR) (%) was also calculated (Table 2A, B). Both in MP and UP, CIR % was considerably higher in females than males. Crude incidence rate (%) in females in MP was reported highest in Morena while in UP in Mahoba district. Comparative analysis of CIR data revealed that the ratio of female: male CIR was comparatively more in UP than in MP (Table 2A, B).

Table 1: Prevalence of cancer in Madhya Pradesh and Uttar Pradesh

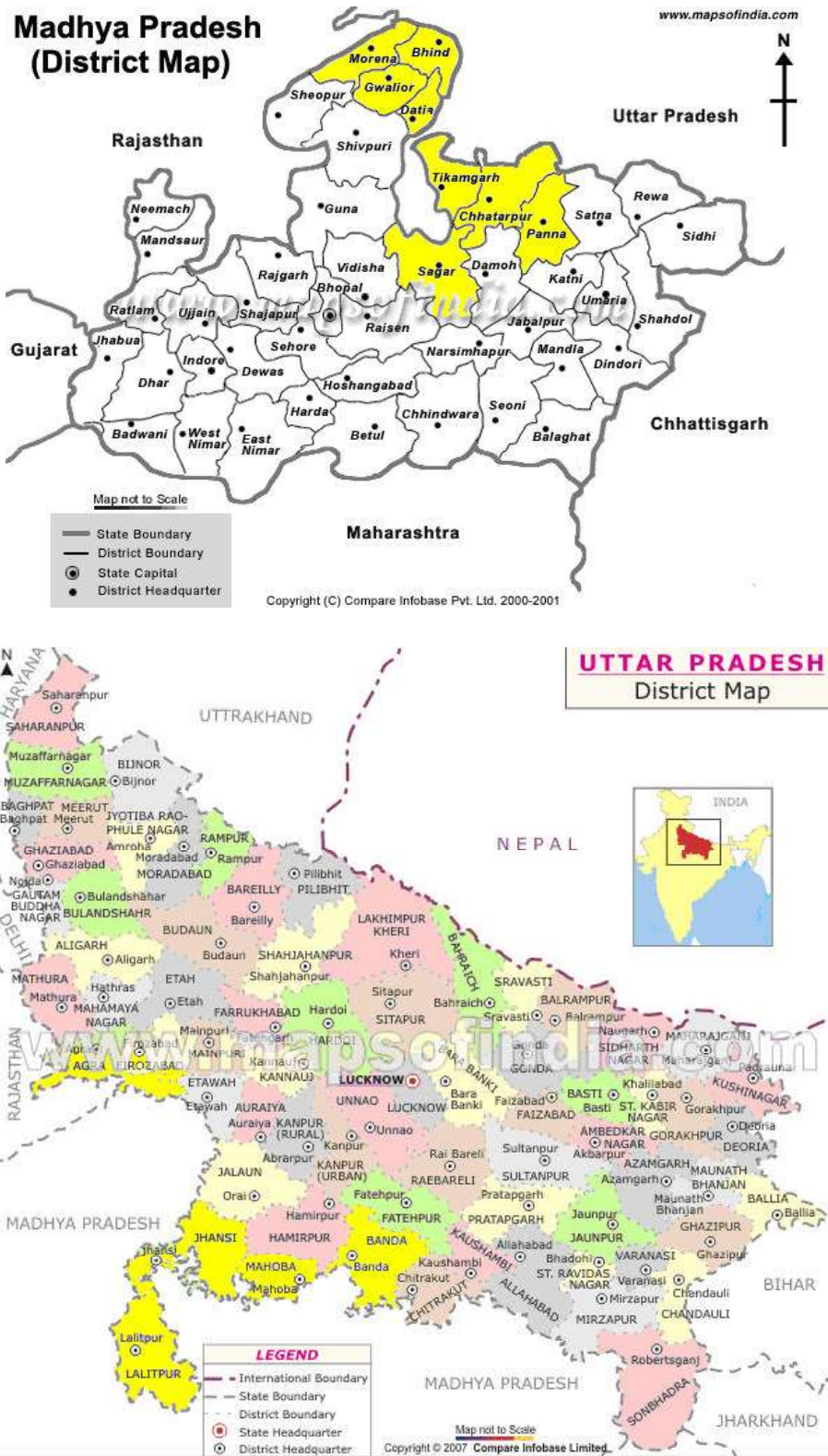| State	Area covered (%)	Prevalence (%)	Relative % prevalence	
			Male	Female
Madhya Pradesh	11.6	15.0	---	62.79
Uttar Pradesh	34.88	0.023	48.15	33.33
Rajasthan	------	51.85	67.67	-----

Fig. 1: Districts (shaded yellow) in Madhya Pradesh and Uttar Pradesh from where patients were registered at Cancer Hospital and Research Institute (CHRI), Gwalior, MP.

Table 2A: Prevalence of cancer in several districts of Madhya Pradesh

City/Town	Prevalence (%)	Relative prevalence %		Crude incidence rate %		
		Male	Female	Male and Female	Male	Female
Gawlior	22.22	16.67	83.33	28.27	8.5	4.16
Morena	14.81	75.00	25.00	20.93	19.07	11.95
Bhind	18.52	25.00	75.00	38.88	---	68.62
Datia.	14.81	50.00	50.00	57.88	53.75	31.35
Chattarpur	14.81	75.00	25.00	22.17	31.35	11.80
Sagar	00.04	----	100.00	20.93	---	8.75
Bhanpura	00.07	----	100.00	----	---	---
Dabra	00.04	-----	100.00	----	---	---
MP				3.72	2.94	3.46

Table 2B: Prevalence of cancer in several districts of Uttar Pradesh

City/Town	Prevalence (%)	Relative prevalence %		Crude incidence rate %		
		Male	Female	Male and Female	Male	Female
Jhanshi	13.33	50.00	50.00	9.54	8.92	10.25
Mahoba	26.67	50.00	50.00	51.30	47.87	55.25
Lalitpur	20.00	-----	100.00	20.46	----	43.62
Agra	13.33	50.00	50.00	3.46	3.29	3.76
Banda	13.33	-----	100.00	13.33	----	28.83
Firozabad	13.33	50.00	50.00	8.15	7.54	8.86
UP				0.72	0.45	1.01

Table 3: Prevalence of age associated major female, male and common cancers.

ICD	Type of Carcinoma	Prevalence (%)	Relative % distribution in male and female					
			Age groups					
			0-25		25-50		50-75	
			Male	Female	Male	Female	Male	Female
180	Cervix	33.56	--	--	--	64.29	--	35.71
183	Ovary	11.62	--	--	--	75	--	25
174	Breast	9.3	--	--	--	66.67	--	33.33
179	Uterus	6.98	--	--	--	50	--	50
162	Lung	4.65	20	--	--	--	80	--
141	Tongue	4.65	--	--	33.33	--	66.67	--
188	U.B.	4.65	--	--	50	--	50	--
150	Esophagus	4.65	--	--	50	--	--	50
151	Stomach	2.33	--	--	--	50	50	--
200	Lymphoma	4.65	100	--	--	--	--	--
145	Buccal	6.98	--	--	--	--	100	--
156	G.B.	2.33	--	--	--	--	100	--
185	Prostate	2.33	--	--	--	--	100	--
204	Others	2.33	--	100	--	--	--	--

Geographical variation in cancer prevalence in MP and neighboring state UP reported here is well supported by reports of Klassen and Elizabeth [7] on prostate cancer. They described in their report that one of the most striking characteristics of prostate cancer was the degree of geographic variation in its patterns of occurrence and progression; this variation was apparent at local, national and international levels.

Table 4A: Crude incidence rate of female cancers in MP

City/Town	Crude incidence rate (%)			
	Cervix	Breast	Ovary	Uterus
Gawlior	3.12	0.53	----	----
Morena	----	11.59	----	----
Bhind	34.31	----	17.15	17.16
Datia	----	----	21.35	----
Chattarpur	11.80	----	----	----
Sagar	----	8.72	----	----
MP	1.73	0.53	0.53	0.53

Table 4B: Crude incidence rate of female cancers in UP

City/Town	Crude incidence rate (%)			
	Cervix	Breast	Ovary	Uterus
Jhanshi	----	----	----	----
Mahoba	27.63	----	----	----
Lalitpur	14.54	----	17.15	17.16
Agra	3.76	----	21.35	----
Banda	28.83	----	----	----
Firozabad	----	8.86	----	----
U.P.	0.51	0.102	0.53	0.53

Table 5: Major risk factors for cancers

ICD-9	Carcinoma	Prevalence (%)	Risk factors			
			Tobacco	Alcohol	Vegetarian	Non-vegetarian
180	Cervix	33.56	6.25	--	3.13	31.25
183	Ovary	11.62	--	--	--	12.5
174	Breast	9.3	--	--	--	9.37
179	Uterus	6.98	--	--	3.12	3.13
162	Lung	4.65	16	6.25	6.25	9.37
141	Tongue	4.65	9.3	3.13	--	9.37
188	U.B.	4.65	--	--	--	--
150	Esophagus	4.65	3.13	--	--	6.25
151	Stomach	2.33	--	--	--	50
200	Lymphoma	4.65	--	--	--	3.13
145	Buccal	6.98	3.13	--	--	3.13
156	G.B.	2.33	3.13	--	--	3.13
185	Prostate	2.33	3.13	--	--	6.25
204	Others	2.33	--	--	--	--

Prevalence of Site Specific Carcinomas: Table 3 shows prevalence of site specific caners and its age wise divisions. Prevalence (%) of major female cancers *viz.,* cervical, breast, ovary and uterus together accounted for 55% while remainder of the male and female cancers accounted 45%. Prevalence (%) of cervical alone among all other cancer was noted highest (34%). In case of ovary, breast and uterus prevalence (%) reported were 9.3%, 7% and 5%, respectively. Lung cancer accounted for 12% of all cancer followed by buccal cancer (7%). Age wise distribution pattern of cancer prevalence indicated that both males and females between the ages of 25 and 50 years and 50 and 75 years were most commonly affected. 51% and 41% cancer affected people were between the ages of 50-75 and 25-50 years, respectively. While most (37%) of the females affected were aged between 25-50 years males (30%) were aged 50-75 years. In M.P. crude incidence (%) rate of cervical cancer noted

almost double than other female cancers. However, in U.P. the crude incidence rate recorded for all the major female cancers were almost similar. Bhind in M.P. and Lalitpur in U.P. reported very high cumulative CIR of major female cancers respectively 69 and 49% (Table 4 A, B).

Previously, Harirchi *et al*. [13] have reported epidemiology of breast cancer in Iran. The mean age of breast cancer patients was 47 years and number of breast cancer cases in the age group 40–49 was higher. In the present report most of the females with carcinomas of cervix, ovary, breast and uterus were in the age group 25-50 years. Although the data presented here are not sufficient enough to support true incidence or prevalence, perhaps suggest that the Indian breast cancer patients are relatively younger than other western counterparts.

Risk Factors Associated with Cancers: Major risk factors associated with cancers identified were tobacco and diet particularly non-vegetarian. Alcohol was identified as minor risk factors mainly for lung and tongue cancer. Table 5 indicates that 87 % non-vegetarians were at high risks of all types cancers. 56 of 87% non-vegetarian females were at the high risk of major female cancers viz., cervix, ovary, breast and uterus. Further, 31 of 56% non-vegetarians females were at highest risk of cervix cancer though they (6%) also had habit of chewing tobacco, followed by ovary (13%), breast (9%) and uterus (3%). Risk factors for breast cancer are manifold. However, risk factors, such as age and family history are well established [6]. Research in the past decade has further elucidated disease aetiology, in particular the role of hormones and the discovery of breast cancer susceptibility genes (e.g. BRCA1, BRCA2) [3]. 18 of the 87% non-vegetarians were suffering from lung and tongue cancers. Form the Table 5 it is very clear that 50% of stomach cancer patients were mainly non-vegetarians. Environmental and dietary influences are likely to be significant causes of all types of carcinomas [14]. Tobacco was identified as the next major cause of the cancer as 41% of the patients were tobacco chewers. 16 and 9 of 41% tobacco chewers had lung and tongue cancer. Although lung cancer has a multicausal aetiology, tobacco accounts for 85–90% of all cases [8]. Further, 6% tobacco chewers were however diagnosed with cervix cancer. Remaining 9 % tobacco chewers were diagnosed with buccal, gall bladder and prostate cancers. The principal impact of tobacco smoking was seen in higher incidence of cancers of lung [1, 15]. In addition, 13 % of the patients were alcohol consumers who were on the high risks of lung and tongue cancers. Epidemiological studies carried in India and abroad have shown that increased alcohol consumption is casually associated with cancers at various sites such as oral cavity, pharynx, larynx and esophagus [15].

CONCLUSION

Epidemiological studies provides research base for development of appropriate strategies to aid in national cancer control programme. The present report on epidemiology of cancers in parts of Madhya Pradesh and Uttar Pradesh not only provides important information on trends of cancer prevalence and incidence but most certainly in reorganization of risk factors associated with various types of cancers. Cleary the present study suggested tobacco and diet (non-vegetarian) as crucial risk factors associated with cancers in MP and UP. Hence, elimination of tobacco use and nutritional counseling as primary prevention of cancer particularly lung cancer and female cancers must remain a priority for teenagers and young adults. Besides epidemiology, tremendous progress has been made in areas such as molecular epidemiology, screening and chemoprevention for prevention and cure of cancers. However, a combined strategy of traditional and advanced molecular epidemiology would be highly effective in cancer control and prevention programme.

REFERENCES

1. Murthy, N.S., A. Juneja A.R. Prabhakar and U.K. Luthra, 1990. Cancer projection by the turn of century. Indian J. Cancer, 27: 74-84.
2. Halmos, B., P.M. Boiselle and D.D. Karp, 2003. Lung cancer. Seminars in Oncology Nursing, 19: 261-267.
3. Washbrook, E., 2006. Risk factors and epidemiology of breast cancer. Women's Health Medicine, 3: 8-14.
4. Guppy, A.E., P.D. Nathan and G.J.S. Rustin, 2005. Epithelial Ovarian Cancer: A Review of Current Management. Clin. Oncol., 17: 399-411.
5. Wani, K. and C.K.K. Nair, 2003. Genetic alterations in cervical cancer. Indian J. Exp. Biol., 41: 789-96.
6. Rubagotti, A., G. Martorana and F.M. Boccardo, 2006. Epidemiology of Kidney Cancer. Eur. Urol. Supplements, 5: 558-565.
7. Klassen, A.C. and A. Elizabeth, 2006. What Can Geography Tell Us About Prostate Cancer? Am. J. Prevent. Med., 30: S7-S15.

8. Ruano-Ravina, A., Figueiras and J.M. Barros-Dios, 2003. Lung cancer and related risk factors: an update of the literature. Primary Care Update for Ob/Gyns, 10: 87-94.

9. Lukanich, J.M., 2003. Section I: Epidemiological review. Pub. Health, 117: 149-156.

10. Murthy, N.S. and A. Mathew, 2000. Cancer epidemiology, prevention and control. Cur. Sci., 86: 518-527.

11. WHO, The World Health Report, Geneva, 1997

12. Mathew, A., P. Gangadharan, C. Varghese and M.K. Nair, 2000. Diet and stomach cancer: A case control study in south India. Eur. J. Cancer Prevention, 9: 89-97.

13. Harirchi, I., M. Ebrahimi, N. Zamani, S. Jarvandi and A. Montazeri, 2003. Breast cancer in Iran. a review of 903 case records. Seminars in Oncology Nursing, 17: 72-77.

14. Brawley, O.W. and S. Barnes, 2001. The epidemiology of prostate cancer in the United States. Lung Cancer, 32: 255-264.

15. Nandkumar, A., 1990. A population based case control investigation of cancers of the oral cavity in Bangalore, India. British J. Cancer, 62: 847-851.