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Profile of Patients at a State-Run Tertiary Cancer Hospital in India: An Audit

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Background: Decreased cancer survival in developing countries is attribute to advanced stage at diagnosis, limited access to cancer care and unaffordability of treatment. Government of National Capital Territory (NCT) of Delhi set up a tertiary level cancer centre in the capital of India where world class tertiary level care is offered no cost. The present study was undertaken to assess the patient demographics of the hospital and descriptive statistics evaluated to arrive at better measures for patient treatment.
Materials and methods: This is a retrospective study of all the patients registered in the Hospital in 2014. Information on socio demographic, diagnosis, dietary details at the time of registration followed by clinical extent of the disease and stage was analysed.
Results: A total of 6900 patients registered at the hospital in 2014. 3687 patients were found to be eligible to be included in the study. The highest number of cancer cases seen in the adult age group of 21-65 years (2717; 70%). Carcinoma breast in females (424; 11%) followed by carcinoma cervix (235; 6.4%) and in males. Head and neck cancers (928; 84%) followed by carcinoma lung (226; 82%) were common. Most common metastatic cancer at presentation was hepatobiliary (182; 64%) followed by lung (173; 63%).
Conclusion: 21-65 years was the most common age group for all cancers with breast cancer in females and head neck cancers in males being the commonest cancers. Hepatobiliary and lung cancers behave aggressively and are frequently metastatic at presentation in Delhi and Northern India.

Keywords: Cancer, audit, India, breast, cervix, lung

Introduction

The International Agency for Research on Cancer GLOBOCAN project has predicted that India's cancer burden will nearly double in the next 20 years, from slightly over a million new cases in 2012 to more than 1.7 million by 2035(1). The number of deaths due to cancer is expected to rise from 680,000 in 2012 to 1.2 million in 2035 years (1). A decreased survival in developing countries is likely due to a combination of advanced stage at diagnosis, limited access to quality cancer care and the inability of patients to afford optimum treatment (2). NCCP first came into existence in 1975 to facilitate better management of cancer treatment by way of improving infrastructure

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for the cancer treatment facilities at existing Government or autonomous hospitals (3). Development of oncology wings in existing medical college hospitals, establishment and support of the regional cancer centers and establishment of dedicated tertiary level cancer care centers across several states have been the main areas of thrust (3). Similar efforts to reinforce the medical colleges with separate oncology wing have been expounded by State Governments as well. In a first, the Delhi Government set up a tertiary level cancer center in the capital of India, where world-class tertiary level care is offered to the cancer patients at no cost (4). This includes all expenditures from investigations to surgery, radiation therapy and chemotherapy. Since its inception in 2006 and fully functioning in 2011, there has been an increase in the patient inflow.

India does not have an established national registry exists that provides overall cancer incidence or mortality data. However, the National Cancer Registry Programme (NCRP, established by the Indian Council of Medical Research in 1981) provides population-based data from a selected network of 28 cancer registries located across the country (5). It is crucial to create and analyze the cancer patient population as it aims to provide a research base for developing appropriate strategies to aid in the National Cancer Control Programme (NCCP). It would encompass within its purview the planning, monitoring and evaluation of related activities under NCCP (5). This data is useful in assessing the appropriateness of services provided by the government, the utilization of resources and yield in terms of cure, the lacunae in services provided and any additional measures that may be required to cater to the cancer patients of the country. It provides an overview of the cancer awareness in the community and additional measures required for appropriate management of cancer patients at all levels of care.

The purpose of a cancer registry program is to collect data regarding the patient's name with unique identification number (UID to avoid repetition), age, gender, etiology, geographical distributions, type of cancer, site of cancer, grading and staging of cancer (to evaluate degree of invasion and metastasis), management, morbidity and mortality.

The audits are a smart way of assessing the profile of patients presenting to a hospital and analyze its preparedness in terms of infrastructure and human resources to treat them successfully. Apart from these, treatment protocols also need to be sculpted according to the needs of the patients, workforce training to handle emergencies in particular age groups need to be defined. In the case of a younger cohort of cancer patients, more aggressive cancer regimens may be framed to provide a maximum chance of cure to these patients.

The Delhi State Cancer Institute, Delhi as stated elsewhere was set-up by the Government of National Capital Territory, Delhi for providing tertiary level care to the needy patients for free (4). With the rapidly growing patient numbers each year and increased advanced-stage disease at the presentation, it became incumbent to study the demographics of patients presenting to the hospital and whether the goal of achieving cure in these patients was being fulfilled. To answer many such questions, the present retrospective study was undertaken to assess the number of patients registering at the hospital and the descriptive statistics evaluated to arrive at better measures for patient treatment and outcomes.

Material and Methods

This is a retrospective study of all the patients registered in the Hospital registration system from 1st January 2014 to 31st December 2014. There is a pre-devised software questionnaire that records on socio-demographic, diagnosis, dietary details at the time of registration followed by the clinical extent of the disease, stage, treatment, prognosis of the disease etc. as manually recorded in the case records by the clinicians.

The International Classification of Disease (ICD) topography codes (ICD10: C00–C99) are used for classification of cancer diseases by using the Manual of International Statistical Classification of Disease and Related Health Problems (10th revision) published by the World Health Organization (6). A permission for research work was taken from concerned institutional concerned authorities.

Statistical Analysis

Collected data were entered in MS Excel, and results generated were analyzed. Descriptive statistical measures such as percentage, mean, and standard deviation were applied.

Results

A total of 6900 patients were registered at the hospital between 1st January 2014 and 31st December 2014. Of these 2657 patients were enrolled as screening patients, and 4243 patients were registered as confirmed cases of cancer having an established diagnosis of cancer. All the data was thoroughly checked for repetitions and eligibility for the diagnosis of cancer. Patients having multiple cancers were counted as a single entry.

Three thousand six hundred eighty-seven patients were found to be eligible to be included in the study with complete data entry. The limitation of this study is where the data regarding the number of patients of the screening category converting to confirmed cancer are not documented. Out of 3687 analyzable patients, 1540(41%) were females, and 2147(49%) were males. Vegan population was 75%(2779) as compared to non-vegan eating, who was 25%(908). There were 7% (247) unmarried patients as against 93% (3440) married individuals. The food habits and marital status were recorded to ascertain contribution of factors in the development of cancer.

Table-1. Age-wise distribution of patients

Age Range	No. of patients	
	n	%
0-10 years	54	2
11-20 years	73	2
21-30 years	242	7
31-40 years	569	15
41-50 years	828	22
51-60 years	971	26
61-70 years	706	19
71-80 years	206	6
81-90 years	37	1
91-100 years	1	0.03
Total	3687	100

As depicted in Table-1, there was a gradually increasing age-specific incidence of cancers with the highest in the age group of 51-60 years having 26%(971). For statistical analysis, the age groups were divided into pediatrics (01-20), Adult (21-65 years) and geriatric (>65 years). The highest no of cancer cases seen in the adult age group of 21-65 (2717;70%),>65 (843; 21%) and only 9% cases in pediatric age (Table-2).

Table-2. Age range of patients

Age Range	No. of patients	
	n	%
01-20 years	127	21
21- 65 years	2717	70
>65 years	843	9
Total	3687	100

Table-3. State-wide distribution of patients registered for treatment

State	No. of patients	%
Uttar Pradesh	2001	54
Delhi	1170	32
Haryana	156	4
Rajasthan	26	0.7
Madhya Pradesh& Chhatisgarh	27	0.7
Uttarakhand	94	2.5
West Bengal	08	0.2
Tamil Nadu	01	0.02
Himachal Pradesh	07	0.2
Punjab	11	0.3
Orissa	02	0.05
NE States	03	0.08
Maharashtra	06	0.2
J&K	06	0.2
Kerala	03	0.08
Karnataka	01	0.02
Bihar & Jharkhand	151	4
Total	3687	100

Majority of the patients coming to the hospital were from the neighboring state of Uttar Pradesh (2001; 54%) followed by Delhi (1170, 22%) as seen in Table-3. This indicates the geographical proximity of the hospital to the surrounding areas of Uttar Pradesh along with the lack of cancer care facilities in the state of Uttar Pradesh that draws such patients in the lure of free treatment to the hospital (7).

Table-4 shows the maximum number of carcinoma breast in females (424;11%) followed by carcinoma cervix (235; 6.4%). In males, the maximum number is seen in Head and neck cancers (928; 84%) followed by carcinoma lung (226; 82%). Amongst head and neck cancers, the most common sites are the oral cavity (310, 8.4%) and oropharyngeal (238; 6.4%) cancers. The cases of intrahepatic/bile duct cancer and gall bladder cancer together constitute 6.75% (249) of all patients. Amongst GI cancers, oesophagus cancers are the most common (145)

Table-4. ICD-O classification of cancer

ICD-O Code	Subside	N
C00	Lip	17
C01-02	Base of tongue	160
C03-06	Oral cavity	310
C07-08	Salivary gland	32
C09	Tonsil	164
C10	Oropharynx	238
C11	Nasopharynx	12
C12-13	PFS, Hypopharynx	54
C14	Oral cavity & Oropharynx- unspecified	06
C15	Oesophagus	145
C16	Stomach	61
C17	Small intestine	05
C18	Colon	51
C19-20	Rectosigmoid & rectum	49
C21	Anus & Anal Canal	18
C22	Liver and intrahepatic bile ducts	41
C23-24	Gall bladder & other biliary tract	208
C25	Pancreas	37
C30-31	Nasal cavity & PNS	38
C32	Larynx	70
C33-34	Trachea, bronchus & Lung	269
C37-38	Thymus, Heart, Mediastinum & Pleura	04
C40-41	Bones	73
C43	Melanoma	13
C44	Skin	21
C45	Mesothelioma- pleura	01
C47-49	Nerves, Retroperitoneum, Soft tissue	80
C50	Breast	424
C51	Vulva	04
C52	Vagina	02
C53	Cervix	235
C54	Uterus	41
C56	Ovary	93
C58	Placenta	06
C60	Penis	17
C61	Prostate	56
C62	Testis	19
C64	Kidney	27
C67	Bladder	104
C69	Eye adnexa	04
C70-72	CNS	84
C73	Thyroid	33
C74	Adrenal Gland	02
C81	Hodgkin's Lymphoma	41
C82-85, C96	NHL	95
C90	Multiple Myeloma	23
C91	CLL-B cell	43
C92-94	Leukemia	87
C95	Leukemia, unspecified cell type	05
C80	Unknown primary site	65
Total		3687

with almost double the incidence as carcinoma stomach. Haematology malignancies together constitute 8%(294) of all malignancies. Prostate cancer accounted for 1.5% (56) of all cancers.

Demographic characteristics were tabulated broadly according to sex distribution and metastatic disease at presentation. As shown in Table-5, 22% (812) of all cases were metastatic at presentation. The most common metastatic cancer at presentation was hepatobiliary (182; 64%) followed by lung (173; 63%) and breast cancers come close third (115; 27%). Only 18 (28%) patients of PUO were metastatic at presentation. Seventy-one (19%) patients of gynaecological cancers were metastatic at presentation.

Discussion

In India, cancer of oral cavity, oropharynx, lung and oesophagus are frequent in males and cancers of cervix, breast, oral cavity, oropharynx and ovary are common in females (8). Current trends suggest that total cancer burden in India for all sites of cancer is likely to double by 2026 due to increasing life expectancy, greater exposure to the environmental carcinogens, continued use of tobacco, deteriorating lifestyle and viral etiology. In men in India, the more common cancers are tobacco-related (5). In our study, we find that 84% of head and neck cancers are seen in men. The oropharyngeal cancers are the most common amongst head and neck cancers, followed by oral cavity cancers. Chewing or smoking tobacco is the

Table-5. Site, Stage and Sex demographics

Site	Number		Female		Male		Metastatic/ Stage IV	
			n	%	n	%	n	%
Head & Neck	1101	30	173	16	928	84	43	4
Breast	424	11	414	98	10	02	115	27
Integumentary + Skeletal	107	3	31	29	76	71	12	11
Soft Tissue	80	2	31	39	49	61	20	25
Gynaecological	381	10	381	100	--	--	71	19
Biliary System+ Pancreas	286	8	161	56	125	44	182	64
Gastrointestinal Tract	329	9	111	34	218	66	104	32
Trachea, bronchus, Lung	274	7	48	18	226	82	173	63
Urinary	131	4	24	18	107	82	27	21
Male genital system	92	3	--	--	92	100	34	37
CNS & Eyes	88	2	35	40	53	60	1	1
Lymphoma & Leukaemia	294	8	98	33	196	67	--	--
Endocrine	35	1	24	69	11	31	12	34
Unknown primary	65	2	9	14	56	86	18	28
Total	3687	100%	1540	42%	2147	58%	812	22%

most cited risk factor in leading to increased incidence of this site. Similarly, lung cancers are the second most common cancers seen in our audit in males secondary to the previously mentioned probable causal factors. In women, carcinoma cervix is a common gynaecological cancer seen in India (5). In our study, the most common gynaecological cancer in women is cancer cervix (235/381). Cancer cervix is seen mostly in a lower socioeconomic strata of society, and the same is corroborated in our study as well since the patients presenting to our institute belonged to lower socioeconomic class. The causal risk factors are poor genital hygiene, HPV infection and early age of marriage in this economic strata, which is quite prevalent in India. In a study by Ali et al. (2011), cervical cancer was the second most common cancer in Delhi after lung cancer overall (9). In our study, breast cancer is the most common cancer in females, followed closely by cervical cancer. The lifestyle factors largely modifiable like tobacco consumption, obesity, hormonal contraceptives, increasing trend of null parity are few factors that have increased incidence of breast cancer in the Indian urban population (10). In this analysis, carcinoma breast was the most common cancer seen in women, almost double than cervical cancer cases.

Malhotra et. Al (2017) reported 6% incidence of gall bladder cancer in Delhi (11). In our study, the gall bladder incidence is around 6.4% and is in sync with the published data. The reason for this is the high rate of cholelithiasis seen in the Indo-Gangetic belt (12). The endocrine tumors comprise ~2% of all malignancies having a prevalence of <200,000 in the United States that makes it an orphan disease (13). The patients presenting with endocrine tumors at the center - of the total 35 patients (0.9%), 24 were females and 11 males. Majority of these endocrine cancers were neuroendocrine - a rare form of slow-growing cancer that has reasonable control by immunotherapy (13). Since in the hospital, these drugs were being supplied for free, patients who were taking primary treatment from other private hospitals also enrolled themselves in the hospital to get free drug access by giving wrong information about the income profile. The proportion of cases metastatic at presentation is 22%, which is much higher than the average mortality rate from cancer in India (14). This is likely because many patients received treatment elsewhere and presented in the metastatic stage. This may not be the exact representation of metastatic cases. The follow-up data is inconsistent as many patients are lost to follow-up since they come from neighboring states; therefore, mortality statistics could not be ascertained in this study. The volume of patients since the functioning of the hospital started peaked in the year 2014 and ever since there has been a steady rise in new registrations. The limitation of this audit is the misrepresentation of income profile by the patients to gain free diagnosis and treatment. The data recording in the patient files is incomplete, and the primary reason is the lack of adequate staff in comparison to the number of patients in the outpatient department. This audit was done to look at the demographics of the patients presenting at the institute, how well the benefit of tertiary level cancer care being provided at no cost is percolating to the intended socioeconomic strata and the measures that can be adopted for optimum benefit.

Few essential lessons are learnt from this audit and measures to rectify them have to be taken up by the hospital administration. The

registration staff needs to be trained in taking the personal details, and a section for previous treatment in a hospital needs to be included in the records. Tertiary level care free of cost is the ideal goal for healthcare across the world. However, increasing cost is a deterrent and almost all state-run hospitals, even in developed nations, charge a subsidized amount for treatment. This initiative by Government of NCT, Delhi, India, is unique given the increasing incidence of cancer in India and is a great example to be followed by other states. In NCT of Delhi, there is a similar Institute in West of Delhi State, and there is a vision of establishing one such center in every corner of the State. The skilled workforce required for the smooth functioning of these centers need to be hired, and care needs to be taken to maintain the vision and mission behind setting up this unique model of tertiary level cancer care facility in the Delhi- the national capital of India.

Conclusion

While the demographics of cancer patients presenting in the institute is representative of the country demographics, still the number of metastatic cases presenting at the institute is higher. The reason behind is that most patients are either diagnosed late or report to the hospital when they have exhausted their finances after taking treatment at private/ corporate hospitals and require free of cost treatment. The present audit has highlighted that the age group having the highest cancer incidence is between 21-65 years of age. Breast cancer is the most common cancer in females, whereas in males, head and neck cancers are the most common. Hepatobiliary cancers are frequently metastatic at presentation, especially in Delhi and Northern India due to which the mortality rates are high in these cancers. It is imperative on the part of policymakers to take adequate steps to prepare the system to effectively manage the cancers afflicting the relatively younger population in India.

Conflict of Interests

The author has declared no conflict of interest for the present article.

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