

# The Hospital-based Socioeconomic Study to Assess the Financial Toxicity among Cancer Survivors

## Abstract

**Background:** Cancer forms the second-most common cause of death worldwide. Once a patient is diagnosed with cancer, socioeconomic life of the patient is altogether changed. In developing countries, like India, as the prevalence of cancer is increasing, policies and schemes need to be incorporated to overcome the financial burden of disease. This study was aimed to know the socioeconomic burden of cancer in our country, so as to further improve the health economics. **Materials and Methods:** This was a prospective study done over a period of 2 years. Three thousand and twelve patients were enrolled in this study that was diagnosed with cancer on biopsy. Interview method with the help of semistructured questionnaire was used to collect the data, and IBM SPSS statistics version 20 was used to analyze this data. The Chi-square test and *t*-test were applied to look for correlation. **Results:** Three thousand and twelve patients participated in the study, and out of them, 73% of the patients were in the fourth to sixth decades. Fifty-seven percent of patients had total family income of <10,000 and when per capita income was calculated about 93% of patients had income <10,000/year. Forty-seven percent of the patients had lost fifty thousand to one lac rupees during treatment, and 73% of the patients did not receive any help from the government and were not covered under any insurance. **Conclusion:** Cancer is a tragic state of illness and affects generations of the patient socioeconomically in a country like India. Most of the population has to spend out-of-pocket expenditure on cancer treatment, and thus, it causes financial catastrophe on the households. Refinement of the health policies is required in concern with cancer to improve the cancer survival and to protect the families from financial hardships.

**Keywords:** Cancer, financial catastrophe, out of pocket, per capita income, socioeconomic status

## Introduction

Cancer is a collective term for a large group of diseases which can affect any part of the body.<sup>[1]</sup> Worldwide, the cancer is recognized as the second leading cause of deaths after cardiovascular diseases and is responsible for 13% of total global deaths.<sup>[2]</sup> Eighteen million new cancer cases (17.0 million excluding nonmelanoma skin cancers) and 9.6 million cancer deaths (9.5 million excluding nonmelanoma skin cancers) were estimated in 2018.<sup>[3]</sup> It is evident that the incidence of cancer is increasing in developing countries also; approximately 70% of the deaths are seen in low- and middle-income countries. It is studied that, in India estimated numbers of people living with cancer, disease is around 2.25 million and every year, over 1.15 million new cancer patients are registered and cancer-related deaths account for

approximately 0.8 million.<sup>[4]</sup> Tobacco (in the form of smoking or chewing) is the most common risk factor for causing cancer and is responsible for 22% of cancer deaths.<sup>[5]</sup> In low- and middle-income countries, infectious agents are responsible for about 25% of cancers.<sup>[6]</sup>

The economic burden of cancer treatment on the individual, their households and to the health system is definitely increasing. Despite advances in knowledge regarding risk factor reduction and improvements in early detection and treatment for several cancers, socioeconomic inequalities still persist in cancer incidence, morbidity, mortality, and survival.<sup>[7]</sup> Socioeconomic analyses of data on cancer incidence, disease stage, treatment, and patient survival need to be studied thoroughly. Key measures of individual socioeconomic status (SES) include educational attainment, occupation, income, and employment status. Lower SES is associated with worsened survival and

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increased incidence of cancer. Differences in stage of cancer is commonly cited as a potential mechanism for the observed relation between SES and cancer outcomes.<sup>[8]</sup> Given the fact that much of the cancer survival is associated with early diagnosis, access to medical technology is also a prominent concern for low- and middle-income countries. The problem increases manifold for developing nations such as India that has poor geographical coverage of medical services and negligible financial protection in health. Despite high cost of cancer treatment, chances of survival are poor.<sup>[9]</sup> The financial burden associated with cancer treatment can force patients and households to acute misery and debts.<sup>[10,11]</sup> Due to the high cost of treatment and unavailability of health insurances in our country, about 60% of the patients had to borrow money from their friends or relatives.<sup>[12]</sup> As well as, cancer affects the social life of the patient and his family in form of loss of jobs, avoidance of social gatherings, etc. Hence, this study was done to examine the socioeconomic toxicity of cancers on patient and family. The special focus was kept on catastrophic financial conditions of the households in our country and the problems they face due to this.

### Materials and Methods

This study was a hospital-based retrospective and prospective study with a study period of 2 years, from January 2, 2017, to January 1, 2019. All the patients reporting to the hospital with a biopsy-proven diagnosis of cancer were enrolled in this study. Over the period of 2 years, data were collected from 3012 patients. Patients with all age groups, gender, and socioeconomic background who gave consent to participate in the study were enrolled. The interview method was followed to collect the data from cancer survival patients with the help of semistructured questionnaire which consisted of various sections meeting the requirement and objectives of the study.

The process of data analysis was done by using the statistical software named Windows IBM SPSS statistics version 20 (IBM, Chicago, USA). Socioeconomic impact of illness was described quantitatively and qualitatively. *t*-test and Chi-square tests were applied to see the correlation between the variables, mean, and significance. The ethical permission was obtained from the Institutional Ethical Committee.

### Results

Over a period of 2 years, 3012 patients were enrolled in the study with a diagnosis of cancer. Age of patients varied from 2 to 91 years. Nearly 28.3% of the patients were between 51 and 60 years age group and formed the maximum percentage. Approximately three-fourth of the study population (72.9%) falls between 41 and 70 years. Table 1 shows the distribution of study population according to the age and gender.

Female predominance was seen in the study (53.6%) as compared to males (46.4%) [Table 1]. In extremes of ages

males outnumbered females, but in most predominant age group numbers of female patients was more than males. On statistical analysis, the difference was statistically significant (0.05).

Patients of different states reported in our institute during this period of time. Maximum number of patients were residents of Haryana (36.5%) followed by Punjab (31.1%) and Uttar Pradesh (10%). The geographic distribution of patients is represented in Figure 1. Nearly 68.1% of the patients reported were from the rural areas and 31.9% were from the urban areas, and the difference was statistically significant [ $P = 0.000$ , Table 2]. Majority of the population in our country belong to the rural area which was represented in this study.

Out of 3012 patients, breast cancer was leading with 20.3% followed by oral cavity cancers (16.1%) and esophageal cancers (8.2%). Among males, lip and oral cavity cancers formed 15.5% of total cancers followed by the esophagus (11.7%) and larynx (8.3%), while in females, breast cancer was predominant in 37.2% followed by cervical (15.1%) and ovarian cancers (6.9%).

Majority of the patients (30.1%) were illiterate or below Matriculation (53.3%) depicted in Figure 2.

Monthly income of the patients varied from Rs. 0 to Rs. 100,000 with 87.5% of the patients having income between

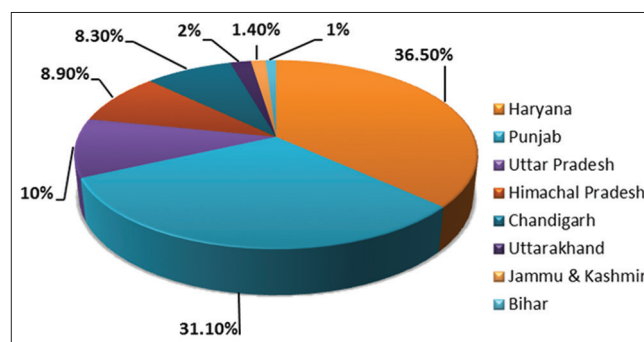


Figure 1: State wise distribution of cancer patients

Table 1: Age and gender cross tabulation

Age (binned)	Gender		Total
	Male	Female	
2-11	9	7	16
12-21	51	29	80
22-31	72	77	149
32-41	154	251	405
42-51	275	448	723
52-60	387	464	851
61-70	343	278	621
71-80	84	53	137
81-90	21	7	28
91+	2	0	2
Total	1398	1614	3012

Rs. 0 and 10,000 and rest 12.5% had income more than that. 57.2% of the patients had family income <10,000. Nearly 93.7% of the patients had per capita income of Rs. 0–10,000/year, which is shown in Figure 3.

When socioeconomic impact of cancer was seen in patients, 78.8% of patients had financial constraints. According to 30.6% of patients, cancer-related treatment had impact on their job or work in the form of inability to work, study break, disturbance in business, agriculture, and household activities.

27.1% of the patients were unable to work due to cancer-related treatment. 29.5% of patients had social impact of the treatment such as avoiding social gathering, abandonment, stress, loss of identity, etc., as shown in Table 3. Overall maximum number of patients had financial problem (18.4%), followed by financial and travelling problem (16.2%). 10.6% patients faced problems regarding accommodation, finance, and traveling. 6.8% of patients had only health issues and 4% had only travelling issues [Figure 4].

During treatment, a lot of patients had loss of family income. 46.9% of patients lost Rs. 50,000–100,000 during cancer treatment. Total loss of income varied from Rs. 10,000 to more than 500,000. Figure 5 depicts the loss of family income in rupees during the treatment.

During treatment, 73.2% of the patients did not get any help from the government for treatment of their disease and 52.9% of patients had to borrow money. Only 0.3% of patients had health insurance.

Using *t*-test, paired sample statistics of income of the patient and loss of income due to cancer treatment with the

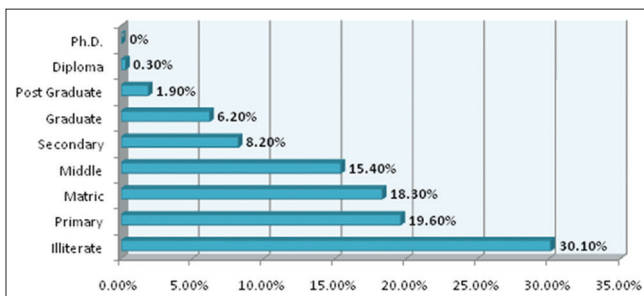
average income of patient of Rs. 4608.27 and the average loss in family income due to cancer of Rs. 119,914.51 had  $P = 0.087$ . Paired sample correlations in per capita income and loss in family income due to cancer treatment with average per capita income of Rs. 3967.30 and average loss in family income due to cancer of Rs. 119,914.51 had  $P < 0.05$  and was statistically significant [Table 4].

### Discussion

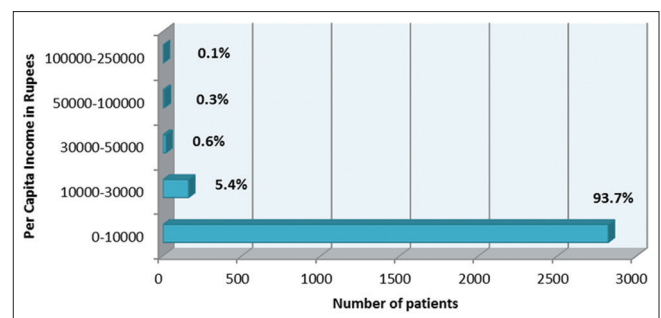
Cancer remains a major public health problem that profoundly affects more than 1.7 million people<sup>[13]</sup> diagnosed each year, as well as their families and friends. It is the second-most common cause of death in the United States, exceeded only by heart disease, accounting for nearly one in every four deaths.<sup>[13]</sup> The incidence of some of the cancers is increasing. The burden of some types of cancer weighs more heavily on some groups than on others, the rate of which vary by SES, sex, and racial and ethnic group. The economic burden of cancer is also increasing as the newer technologies and treatments have become available. The national expenditures for cancer continue to rise and exceed overall medical care expenditures.

**Table 2: Gender × locality cross tabulation shows statistical significance ( $P=0.000$ )**

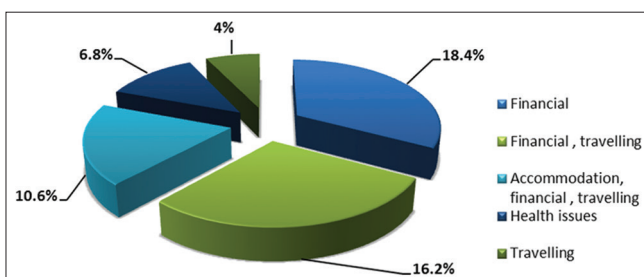
Gender	Locality		Total
	Rural	Urban	
Male	996	402	1398
Female	1054	560	1614
Total	2050	962	3012



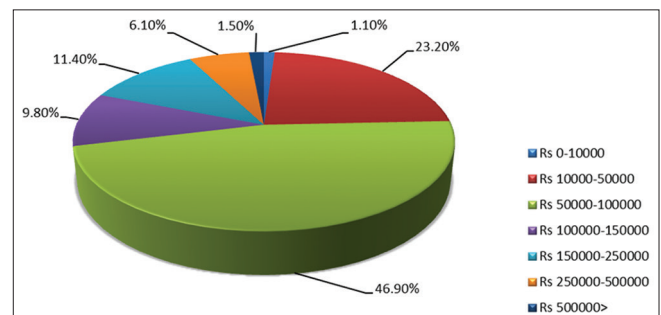
**Figure 2: Educational qualification of patients**



**Figure 3: Percapita income (annual in rupees)**



**Figure 4: The problems faced by patients during the illness**



**Figure 5: Loss in family income during the cancer treatment**

Lung cancer is the most commonly diagnosed and most common cause of cancer death in both the sexes all over the world, followed by breast cancer, prostate cancer, and colorectal cancer.<sup>[3]</sup> The most frequently diagnosed cancer and the leading cause of cancer death, however, vary across countries and within each country depending on the degree of economic development and associated social and life style factors. In India, oral cancers are the most common cancers found in males, and breast cancer is the most common among females, which was seen in our study also. Worldwide, the incidence rate for all cancers combined was about 20% higher in men than in women with the incidence rates varying across regions in both males and females.<sup>[3]</sup>

Cancer affected households are having catastrophic financial condition in India. As compared to other diseases, greater number of hospital stays and outpatient visits are required. A very small population is covered under health insurance in our country, thus maximum number of patients and their families have to bear out-of-pocket (OOP) expenditures. In our study, only 0.3% of patients were having health insurance. In a study by Mahal *et al.*,<sup>[11]</sup> the additional expenditures (per member) incurred on inpatient care by cancer-affected households annually is equivalent to 36%–44% of annual household expenditures of matched controls (of INR 9988). Roughly, 34%–42% of all spending (INR 15,343 annually) by an average cancer-affected household is for out-of-pocket treatment inpatient and outpatient expenses. In our study, the financial loss of 47% of patients was between INR 50,000–100,000 and compared to that per capita income of 94% of patients is <INR 10,000.

**Table 3: Social factors and activities affected among the cancer patients**

Factors	Frequency (%)
Unable to work	815 (27.1)
Study loss	54 (1.8)
Agriculture work disturbed	20 (0.7)
Business work disturbed	14 (0.5)
House chores disturbed	16 (0.5)
Commuting issues	4 (0.1)
Loss of job	1 (0)
Only source of income	1 (0)
NA (patients were not affected due to cancer)	2087 (69.3)
Total	3012 (100.0)

NA: Not available

In our study, only 1.5% patients reported social constraints during treatment, but financial constraints were seen in 78.8% of patients. As compared to US, in a study 28.7% of survivors reported at least one financial problem resulting from cancer diagnosis, treatment, or long-term side effects of treatment.<sup>[14]</sup> Due to the treatment of cancer, 30.6% of the patients in our study lost their jobs. This figure was less because most of the patients were females and may not be employed due to illiteracy. Cancer survivors in general are 1.37 times more likely to be unemployed, although age did not have a clear association with unemployment risk.<sup>[15]</sup>

Different social activities were affected in our patients, out of which inability to join any social gathering was the most common, as there is still stigma of being diagnosed as a cancer patient, followed by abandonment and mental stress. Social constraints on disclosure can limit an individual’s ability to communicate openly with others and consequently have negative effects on psychological adjustment, especially in the context of stressful experiences such as the diagnosis and treatment of cancer.<sup>[16]</sup>

Only 26.8% of the patients received support from government, and out of them, only 0.2% of patients had health insurance. In 2018, 10 million Indian households (500 million people) do not benefit from health coverage in India. In 2011, 3.9% of India’s gross domestic product was spent in the sector. The survey carried out in the year 2014 found out that, more than 80% of Indians are not covered under any health insurance plan, and only 18% of the urban population and 14% of the rural population were covered under any form of health insurance.<sup>[17]</sup> Due to the lack of insurances, 12.5% of households had to sell their assets, other 52.9% had to borrow money from others. It has been shown in various studies that due to the high cost of the treatment, patients are compelled to resort to distressed means of treatment financing.<sup>[18-20]</sup> Joe<sup>[12]</sup> in his study found that about 60% and 32% households resort to borrowings and contributions (from friends and relatives), respectively, for cancer hospitalization. It was also noted that OOP expenditure on cancer hospitalization was about 2.5 times of overall average hospitalization expenditure.<sup>[12]</sup>

Overall, about 36.3% and 33.7% of households with cancer patients were spending more than 10% of their annual per capita household expenditure on public and private healthcare facilities, respectively.<sup>[21]</sup>

**Table 4: Paired samples statistics of income of patient, per capita income and loss in family income due to cancer treatment**

	Mean	Frequency	SD	SEM
Income of patient	4608.27	3012	10,230.88	186.41
How much loss of family income has occurred due to illness	119,914.51	3012	149,565.70	2725.23
Per capita income	3967.30	3012	6801.27	123.92
How much loss of family income has occurred due to illness	11,9914.51	3012	149,565.70	2725.23

SD: Standard deviation, SEM: Standard error of the mean

## Conclusion

This study demonstrated financial toxicities faced by the cancer patients during treatment and lack of health insurance in our country. This ultimately affects the treatment outcomes and quality of life of patients. Thus, it is the need of hour to emphasize on health schemes and policies to combat these issues in the treatment of cancer.

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## Conflicts of interest

There are no conflicts of interest.

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