



Economic Burden of Cancer Treatment Among Cancer Patients Attending a Secondary-Level Government Hospital in Haryana: A Hospital-Based Cross-Sectional Study

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ABSTRACT

Background: Cancer is one of the leading causes of illness and death worldwide and poses a major public health challenge. The cost of cancer treatment often imposes a substantial financial burden on patients and their families, particularly in low- and middle-income countries where out-of-pocket expenditure remains high. However, limited studies are available regarding the economic burden of cancer treatment at district-level public healthcare facilities in Haryana. The present study aimed to assess the economic burden of anticancer treatment among cancer patients attending a secondary-level government healthcare facility in Hisar.

Methods: A hospital-based cross-sectional study was conducted at Civil Hospital, Hisar. A total of 80 cancer patients visiting the hospital for document verification related to welfare benefits were included using consecutive sampling. Data were collected through face-to-face interviews using a semi-structured questionnaire. Information regarding socio-demographic characteristics, treatment modalities, healthcare utilization, and treatment-related expenditure was collected.

Results: The mean age of participants was 55.2 ± 10.4 years, and 57.5% were male. Chemotherapy was the most common treatment modality (40.0%), followed by surgery (27.5%) and radiotherapy (20.0%). The mean total treatment-related expenditure was Rs. $23,700 \pm$ Rs. 5,860, with medicines accounting for the highest proportion of costs. Employment was affected among 60.0% of participants. A significant association was observed between the type of healthcare facility and treatment expenditure ($p < 0.05$).

Conclusion: Cancer treatment imposes a considerable financial burden on patients and their families. Strengthening financial protection mechanisms and improving access to affordable cancer care are essential to reduce the economic impact of cancer treatment.

Keywords: • Neoplasms • Economics • Health Expenditures • Cost of Illness • Cross-Sectional Studies • Indian epidemiology

INTRODUCTION

Cancer is one of the leading causes of illness and death worldwide and poses a major public health challenge. According to the World Health Organization, around 19.3 million new cancer cases and nearly 10 million deaths were reported globally in 2020 (1), making cancer one of the leading causes of death worldwide (2). The burden of cancer is expected to increase further due to population ageing, urbanization, and changes in lifestyle-related risk factors.

India is also experiencing a rising cancer burden. Estimates from the Indian Council of Medical Research under the National Cancer Registry Programme reported about 1.46 million new cancer cases in 2022, with projections showing a further increase in the coming years (3). Cancer treatment often requires surgery, chemotherapy, radiotherapy, and long-term follow-up, which can result in substantial healthcare expenditure. In India, where a large proportion of healthcare expenses are paid out-of-pocket, cancer treatment can impose significant financial hardship on households. A national study reported that more than half of Indian households experienced catastrophic health expenditure while seeking cancer care (4).

In Haryana, increasing cancer cases and limited financial protection may further increase the economic burden on patients. However, limited evidence is available regarding the financial impact of cancer treatment at district-level public

health facilities such as Civil Hospital Hisar. Understanding the economic burden at the local level can help policymakers plan appropriate health policies and strengthen financial protection measures. Therefore, the present study was conducted to assess the economic burden of cancer treatment among cancer patients attending this hospital.

METHODOLOGY

Study design and setting

A hospital-based cross-sectional study was conducted at Civil Hospital Hisar, a secondary-level government healthcare facility in Haryana. The study was carried out over a period of six months, from June 2025 to November 2025.

Cancer patients frequently visited the hospital for verification of documents required for welfare benefits, such as the issuance of free bus passes and other government assistance schemes. These visits provided an opportunity to approach eligible participants for the present study.

Study population

The study population consisted of patients aged 18 years or above who were diagnosed with any type of cancer and were receiving or had received cancer treatment, and who visited the hospital for document verification related to welfare benefits

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during the study period. Patients and their accompanying family member (if any) were interviewed regarding the treatment and treatment-related expenses. Patients who were critically ill or unable to provide information were excluded from the study.

Sample size

The initial sample size was calculated using the formula:

$$n = \frac{Z^2 p(1-p)}{d^2}$$

where $Z = 1.96$ at 95% confidence level, $p = 59.4\%$ (prevalence of catastrophic health expenditure among cancer patients reported by Rajpal et al., 2018), and $d = 5\%$ absolute precision. The calculated sample size for an infinite population was 370.

However, the number of eligible cancer patients visiting the hospital for bus pass verification was limited to approximately 15 patients per month. Considering a six-month study period, the accessible population was estimated to be 90 patients. Therefore, finite population correction was applied using the formula: $n = n_0 \frac{1+(n_0-1)/N}{1+(n_0-1)/N}$

where $N = 90$. The corrected sample size obtained was 73 participants. After adding 10% to account for non-response, the final sample size was 80 participants.

Participants fulfilling the eligibility criteria were recruited consecutively during the study period until the required sample size was achieved.

Data collection tool and procedure

Data were collected using a pre-designed semi-structured questionnaire developed using Google Forms. The questionnaire included sections on:

- Socio-demographic characteristics (age, sex, education, occupation, family type, household income, and socioeconomic status by Modified Kuppuswamy Scale5)
- Clinical details (age at diagnosis, duration of illness, complications, and type of cancer treatment)
- Healthcare utilization (type of healthcare facility, number of hospital visits, and hospital admissions)
- Economic burden of treatment, including:
 1. Direct medical expenses (consultation fees, medicines, investigations, and hospitalization costs)
 2. Direct non-medical expenses (travel and related costs)
 3. Indirect costs such as loss of income of the patient or accompanying caregiver

Data analysis

The collected data were entered into Microsoft Excel and analyzed using SPSS version 20.0.

RESULTS

A total of 80 cancer patients participated in the study conducted at Civil Hospital Hisar

Socio-demographic characteristics

The mean age of participants was 55.2 ± 10.4 years. Most patients belonged to the age group of 51–60 years (27.5%), followed by 41–50 years (25.0%). Among the participants, 46 (57.5%) were male and 34 (42.5%) were female. Most participants belonged to nuclear families (45.0%), followed by joint families (32.5%) and three-generation families (22.5%).

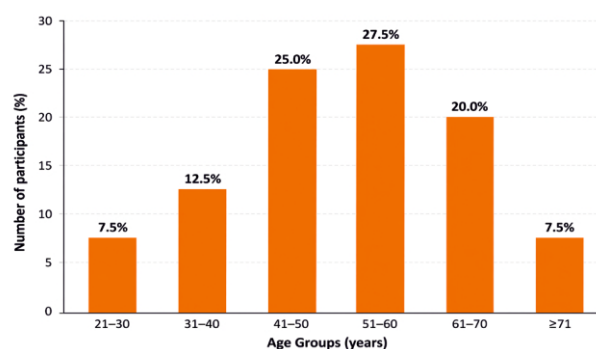


Figure 1: Age distribution of study participants (n = 80)

The majority of participants belonged to the 51–60 years age group (27.5%), and 57.5% were male. Most participants belonged to nuclear families (45.0%) (Table 1).

Clinical characteristics

Chemotherapy was the most common treatment modality (40.0%), followed by surgery (27.5%), radiotherapy (20.0%), and hormonal therapy (12.5%).

Table 2 presents the clinical and treatment-related characteristics of the participants. Chemotherapy was the most commonly reported treatment modality (40.0%), followed by surgery (27.5%). A considerable proportion of participants reported that their employment was affected due to cancer (60.0%).

Table 1: Socio-demographic characteristics of study participants (n = 80)

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	21-30	6	7.5
	31-40	10	12.5
	41-50	20	25.0
	51-60	22	27.5
	61-70	16	20.0
	≥71	6	7.5
Gender	Male	46	57.5
	Female	34	42.5
Type of family	Nuclear	36	45.0
	Joint	26	32.5
	Three generation	18	22.5
Education status	Illiterate	14	17.5
	Primary school	18	22.5
	Middle school	16	20.0
	High school	20	25.0
	Intermediate and above	12	15.0

Table 2: Clinical characteristics and treatment-related parameters (n = 80)

Variable	Category	Frequency (n)	Percentage (%)
Type of treatment	Chemotherapy	32	40.0
	Surgery	22	27.5
	Radiotherapy	16	20.0
	Hormonal therapy	10	12.5
Type of healthcare facility	Government	30	37.5
	Private	34	42.5
	Both	16	20.0
Employment affected due to cancer	Yes	48	60.0
	No	32	40.0
Enrollment in government health scheme	Yes	35	43.8
	No	45	56.2
Hospital admissions during treatment	≤1 admission	28	35.0
	2–3 admission	36	45.0
	≥4 admissions	16	20.0

Economic burden of treatment

Participants reported expenditure related to consultation fees, medicines, investigations, hospitalization, and travel expenses. The average monthly expenditure on cancer treatment was approximately Rs.17,800 ± Rs.6,900. Several patients also reported loss of income due to absence from work or discontinuation of employment during treatment (Table 3).

Among the direct medical costs, expenditure on medicines was the highest, followed by hospital admission charges and diagnostic investigations. Direct non-medical costs included travel and accommodation expenses. Participants also reported indirect costs due to the loss of income of both the patient and the accompanying family member. The mean total treatment-related expenditure was Rs. 23,700 ± Rs. 5,860 (Table 3).

Table 4 shows the association between socio-demographic characteristics and treatment expenditure among the study participants. A higher proportion of participants aged above 50 years reported higher treatment expenditure compared to younger participants. Similarly, male participants and those belonging to nuclear families showed relatively higher expenditure. A statistically significant association was observed between the type of healthcare facility and treatment expenditure ($p < 0.05$), with higher expenditure reported among participants receiving treatment from private healthcare facilities.

Table 3: Distribution of treatment-related expenditure among study participants (n = 80)

Type of expenditure	Mean ± SD (₹)
Direct medical cost	
Consultation fees	1850 ± 620
Medicines	8400 ± 2350
Diagnostic investigations	3250 ± 1140
Hospital admission charges	3600 ± 1520
Direct non-medical cost	
Travel expenses	1350 ± 480
Accommodation/food expenses	900 ± 350
Indirect cost	
Loss of income of the patient	2700 ± 1200
Loss of income of the accompanying person	1650 ± 7202
Total average treatment expenditure	23,700 ± Rs. 5,860

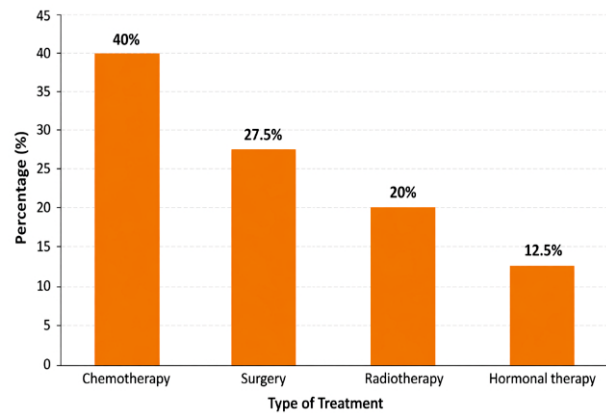


Figure 2: Distribution of treatment modalities among study participants (n = 80)

DISCUSSION

The present study assessed the economic burden of anticancer treatment among cancer patients visiting Civil Hospital Hisar. A total of 80 participants were included in the study. The findings of this study indicate that cancer treatment leads to considerable financial strain for patients and their families.

In the present study, the majority of participants belonged to the 51–60 years age group, followed by the 41–50 years age group. Similar findings were reported earlier by Sung H et al. (2), where the prevalence of cancer was higher among middle-aged and older individuals due to cumulative exposure to risk factors and increasing age-related susceptibility to malignancies.

Regarding gender distribution, males constituted a slightly higher proportion of the study population compared to females. Similar findings were reported by Rajpal et al. (4), where a higher proportion of male cancer patients was reported in studies assessing the economic burden of cancer treatment in India. However, some studies conducted in India have reported a relatively higher proportion of female cancer patients, particularly due to the high burden of breast and cervical cancers among women. Data from the Indian Council of Medical Research–National Cancer Registry Programme (3) indicate that breast cancer is the most common cancer among women in India, followed by cervical cancer. This difference may be influenced by variations in healthcare-seeking behaviour, occupational exposure to risk factors, and sociocultural factors affecting access to care.

Table 4: Association between socio-demographic characteristics and high treatment expenditure among study participants (n = 80)

Variable	Category	High expenditure n (%)	Low expenditure n (%)	χ^2 value	p-value
Age group (years)	≤50	18 (45.0)	22 (55.0)	2.14	0.14
	>50	26 (65.0)	14 (35.0)		
Gender	Male	28 (60.9)	18 (39.1)	1.36	0.24
	Female	16 (47.1)	18 (52.9)		
Type of family	Nuclear	24 (66.7)	12 (33.3)	3.02	0.08
	Joint / Three generation	20 (45.5)	24 (54.5)		
Type of healthcare facility	Government	12 (40.0)	18 (60.0)	5.28	0.02*
	Private / Both	32 (64.0)	18 (36.0)		

*Statistically significant at $p < 0.05$

In the present study, chemotherapy was the most commonly reported treatment modality, followed by surgery and radiotherapy. Similar patterns have been documented in Prinja et al. (6), where chemotherapy forms a major component of cancer management across several malignancies.

The present study also showed that patients incurred considerable direct medical expenses, particularly for medicines, investigations, and hospitalisation. Among these components, expenditure on medicines accounted for the largest share of treatment costs. Similar findings have been reported in a study by Rajpal et al. (4) assessing the economic burden of cancer treatment in India, where medication costs represented a substantial proportion of out-of-pocket expenditure.

The mean total treatment-related expenditure in the present study was $23,700 \pm 5,860$, indicating a significant economic burden for households. In addition to direct medical costs, patients also experienced indirect financial losses due to reduced work productivity or loss of employment, as reported by 60% of participants. A study by Prinja et al. (6) assessing financial toxicity among cancer patients also reported substantial indirect costs related to income loss and caregiver time.

Although some participants were enrolled under government health schemes such as Ayushman Bharat Pradhan Mantri Jan Arogya Yojana, additional expenses related to transportation, diagnostic investigations, and supportive care still contributed to the overall financial burden. Prinja et al. (6) also highlighted that despite the availability of financial protection schemes, households may continue to experience substantial out-of-pocket expenditure during cancer treatment. Overall, the findings of the present study highlight the economic challenges faced by cancer patients and their families, particularly in relation to treatment-related expenses and loss of income during the course of treatment. These findings emphasize the need to strengthen financial protection mechanisms, improve access to affordable medicines, and expand support services for cancer patients at district-level healthcare facilities.

CONCLUSION

The present study highlights that cancer treatment places a considerable economic burden on patients and their families. Most participants reported substantial expenditure on medicines, investigations, and hospital-related services, along with indirect costs such as loss of income. Despite the availability of government health schemes, many patients continued to incur out-of-pocket expenses.

This highlights the need to strengthen financial protection and improve access to affordable cancer care, particularly at district-level public healthcare facilities, to reduce the financial

impact of cancer treatment on affected households.

Strengths and limitations

The present study provides local-level evidence on the economic burden of anticancer treatment among cancer patients attending a district-level public healthcare facility. However, the study has certain limitations. The study was conducted in a single healthcare facility, and the sample size was relatively small. Therefore, the findings may not be generalizable to the broader population.

ETHICAL APPROVAL

Ethical approval for this study was obtained from the Institutional Ethics Committee prior to the commencement of the study. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and applicable institutional guidelines.

Informed Consent

Written informed consent was obtained from all participants prior to their enrolment in the study.

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Conflict of Interest Declaration

The authors declare no conflict of interest.

Data Availability Statement

All data generated or analysed during this study are available from the corresponding author upon reasonable request.

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All authors have read and approved the final version of the manuscript.

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AI Use Declaration Statement

Artificial Intelligence (AI)-based tools were used solely for grammar checking, language editing, and formatting purposes. The authors take full responsibility for the accuracy, integrity, and originality of the manuscript content.

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