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An Observational Analysis of Financial Toxicity Inflicted on Patients and Their Family in Cancer Treatment: A Study From the Kumaon Region of India

Lalit Mohan[1], Aradhana Arya[2], Kailash Chandra Pandey[3], Nirdosh Kumar Pant[4], Swaroop Revannasiddaiah[4], Satya Sadhan Sarangi[5], Jyoti Singh[6]

[1]Senior Resident, Department of Radiotherapy, Govt Medical College, Haldwani, Uttarakhand, [2]Assistant Professor, Department of Anaesthesiology, Govt Medical College, Haldwani, Uttarakhand, [3]Associate Professor and Head of Department, Department of Radiotherapy, Govt Medical College, Haldwani, Uttarakhand, [4]Assistant Professor, Department of Radiotherapy, Govt Medical College, Haldwani, Uttarakhand, [5]Junior resident, Department of Radiotherpay, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, [6]Senior Resident, Department of Radiotherapy, Institute Rotary Cancer Hospital, All India Institute of Medical Sciences, New Delhi.

Abstract

Background: Aim: Treatment of cancer requires multi-modality and multi-specialty care. The importance of financial toxicity inflicted on patients and their family remained under estimated. We planned to devise a tool to grade financial toxicity, which can further be used to predict expected financial toxicity in cancer treatment and subsequently make an informed, explained and unanimous decision for cancer management. **Subjects and Methods:** All patients diagnosed and treated for cancer with radical intension from 1st April 2012 to 31st March 2017; visiting in outdoor patients department of Swami Rama Cancer Hospital and Research Institute, Haldwani, India were asked to read and fill questionnaire, inquiring the details of their expenditure on cancer investigations, specialist consultation, purchasing drugs and undergoing procedures. Of 189 patients eligible for this study visited in outdoor patient department during 1st April 2017 to 31st March 2018; 173 patients were analyzed. **Results:** Of the 173 patients analyzed in the study 106 (61.3%) patients were living below poverty line. Grade I, II, III and IV financial toxicities experienced by patients were 19%, 28%, 32% and 21% respectively. There was no significant difference in financial toxicity in below poverty line or above poverty line patients. **Conclusion:** Financial toxicities are of the same grade irrespective of socio-economic status of patients as every patient's total expenditure on cancer treatment is in accordance with their income. We can omit extremely financially toxic treatment if non-inferior and cost effective treatment is available.

Keywords: Financial toxicity, cancer treatment, poverty.

Corresponding Author: Dr Aradhana Arya, Assistant Professor, Department of Anaesthesiology, Govt Medical College, Haldwani, Uttarakhand

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Introduction

In a developing country like India where government health services are usually overburdened, a large proportion of patients approach private hospitals for early treatment. Most of the patients visiting in Swami Rama Cancer Hospital and Research Institute, Haldwani, India (SRCH & RI) hospitals are below poverty line (Departmental data). The high rate of treatment interruption and lost to follow up is attributed to high cost of cancer treatment (Zafar SY et al.). Cancer treatment and outcome dilemma and cost concerns are very high among cancer patients (Honda K et al.). Poor implementation of government health insurance policies add further to the problem.

At the department of Radiotherapy, Swami Ram Cancer Hospital and Research Center, Haldwani which runs as a part of the Government Medical College, Haldwani, Nainital (GMC HDW) and caters health services to hilly region of Kumaon, Uttarakhand and northern Uttar Pradesh state of India; over the period of 2014 to 2018, it is estimated that about 68% (Departmental data) of all patient diagnosed with cancer were living below poverty line (BPL) (Poverty line defined as per specification of Rangarajan committee).

This prompted us to analyze and generate a financial toxicity grading system which will help to offer apt, non-inferior and cost effective treatment. We also aim to utilize the collected data to analyze the correlation between the patient's annual income and corresponding financial toxicity. The conclusion of the study could in turn be utilized to suggest and recommend guidelines pertaining to a pragmatic cancer management.

Subjects and Methods

This research project was approved by Institute ethical

committee, GMC HDW. The study design employed was observational cross-sectional type. All patients were eligible if they are treated for cancer with radical intension from 1st April 2012 to 31st March 2017; be in government hospitals, private health organizations or both; aged between 18 to 80 years, visiting in outdoor patients department of SRCH & RI. Firstly participants were explained about the study and after due informed and written consent they were asked to read and fill questionnaire, which was available in both English and Hindi and was focused on demographic, socioeconomic and detailed of their expenditure on cancer investigations, specialist consultation, purchasing drugs and undergoing procedures. The indirect loss of money in cancer treatment, e.g. loss of employment, transportation, stay in hospital; though practically impotent but not included in total expenditure in cancer treatment due to excessive subjective variance. In case of illiterate patients, a resident doctor/ medical staff assisted patients to read and understand the questionnaire. Patient refusing consent or withdrawal of consent, giving ambiguous history or self conflicting entries were excluded from the study. Patient's identity was concealed.

Socio-demographic information include name, age, sex, marital status, address, level of education, occupation, family size and monthly income. Clinical information includes height, -weight, co-morbidity, type of malignancy or diagnosis and clinical stage.

For grading financial toxicity average annual income of family from all sources was calculated, a total expenditure on investigations, specialist consultation, purchasing drugs, undergoing procedures and surgeries was added and then compared with total annual income of family. If the total expenditure was less than annual income; it was graded as I, if less than three times of annual income or patient borrowed money; grade II, if more than three times of annual income than grade III and if patients had to sell belongings or assets than grade IV.

Table 1: Lalit -Aradhana's financial toxicity grading system

Grade of Toxicity	Total expenditure on radical treatment
I	Less than annual income; no change in leisure activities.
II	Less than three times of annual income or borrowing money.
III	More than three times of annual income or deprivation of necessity e. g. inability to pay school fee of children, monthly water and electricity bills in time.
IV	Selling belongings, jewelry or assets or using retirement funds.

If patient falls in two grades of toxicities; the higher grade is considered valid. We kept the financial toxicity grading system least complicated for feasibility of applying and good compliance.

Data was analyzed using Base SAS version 9.4. Statistical analyses included descriptive statistics. We calculated frequencies for categorical data and mean and standard deviation (SDs) for continuous data.

Results

Of the 189 patients participated in the study; eleven patients were excluded for consent withdrawal and five patients were due to ambiguous or self contradictory history. Of the 173 patients analyzed about three fourth of patients; 124 (74%) were male and 55 (26%) were female. Mean age of presentation was 56 years (SD 11.6). About two third of patients, (112, 65%) were from rural and one third (61, 35%) from urban regions of adjoining areas.

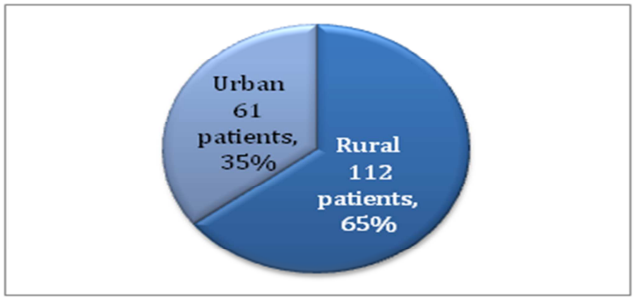

Figure 1: Distribution of urban and rural patients

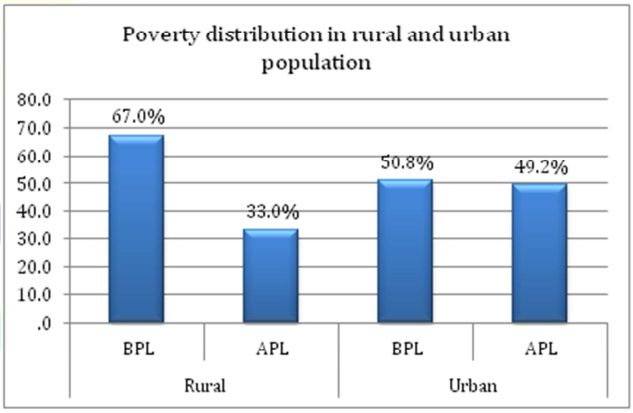

Figure 2: Poverty distribution in rural and urban population

Assessment of level of education showed that 27 patients (16%) could not read and write, 62 patients (36%) went to school upto class VIII, 36 patients (21%) went to high school, 26 (15%) patients were intermediate, 16 (9%) were graduate and six were post graduates. All the patients were married and commonly accompanied by their spouse. Only 16 (9%) patients were illegible for reimbursement of treatment expenditure from government or had health insurance policy.

Median family size was 6, ranging from 2 to 11. Mean monthly income of family was 4752 Indian national rupee (INR) per month and per capita income was 792 INR per month only. As per the recommendation of Rangarajan committee; poverty line is set at INR 32 and INR 47 per capita per day income for rural and urban population respectively. Keeping this as poverty line 61% patients evaluated in this study fall below poverty line. Patients laying above and below poverty line are equal in urban but BPL patients are more (67%) in rural population.

Agricultural is the most common (76; 44%) source of income followed by private jobs (28, 16%), daily wedges workers (24, 14%), retired government employee (4, 2%), government employee (5, 3%) and 3 patients had some other profession. Most of the females were (33) homemakers.

Grade I, II, III and IV financial toxicities experienced by patients were 19%, 28%, 32% and 21% respectively. There was no significant difference in financial toxicity in BPL or above poverty line (APL) patients. It was alarming to find that about one fifth of patients (21%) sold their belongings/ jewelry or assets or used their retirement funds for cancer treatment. Grade IV toxicities were slightly less in BPL patients; which might be due to lack of valuable assets to sell.

The mean expenses on cancer treatment was 58,733 INR for BPL patients and 1,36,253 INR for APL patients. Sub-group of patients who underwent surgery or took some part of their treatment in private hospitals experienced much higher grades of financial toxicity. The completion rate of recommended treatment was less in poor patients (68%) as compared to APL patients (86%) though experiencing same grade of toxicity.

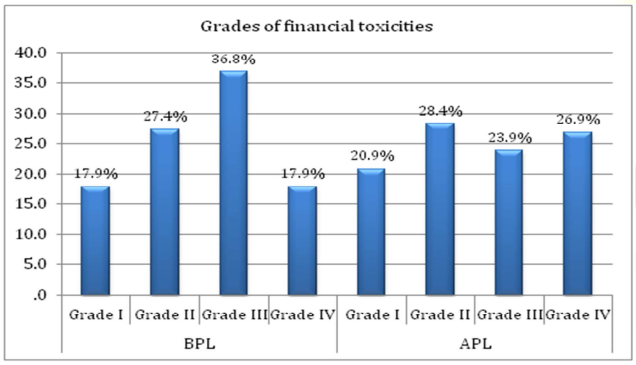

Figure 3: Grades of financial toxicities in BPL and APL patients

Discussion

To the best of our knowledge and research this is the first detailed study evaluating financial toxicity inflicted on patients and their family in cancer treatment from the Kumaon region of India. Our study showed that it was feasible to use a financial toxicity grading system in OPD and discuss available treatments and associated financial toxicity with patients and their family. It is proposed that financial burden due to treatment should be considered a 'toxicity' of treatment similar to physical adverse events (Zafar SY et al.). Some authors have even proposed that financial toxicity should be reported along with physical toxicities in publications of clinical trials (Gyawali B et al. & Saltz LB et al.).

The study only measures financial toxicity during radical treatment but not the expenses in recurrent disease or in palliative care. The true expenses are definitely more than calculated in this study. In addition to objective financial burden, another important component of financial toxicity is subjective financial distress. Compared to objective burden, much less has been published on subjective financial distress and its impact on the cancer experience. Based on available evidence, financial distress affects patients' well-being and quality of care (Hanratty B et al.).

An important limitation of our study is the small sample size and patients population of a small socio-demographic area. Another important limitation of our study is that it was a single centre study and the results may not be generalized.

Conclusion

Financial toxicities are of the same grade irrespective of socio-economic status of patients as every patient's total expenditure is in accordance with their annual income. We can omit extremely financial toxic treatment if non-inferior and cost effective treatment is available. In this way we can create a patient friendly mode of treatment.

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