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COST ANALYSIS OF ANTI-CANCER DRUGS USED IN A TERTIARY CARE HOSPITAL

Pharmacology

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ABSTRACT

Background: Anti-cancer drugs are costly & are the main reasons for poor compliance in India & with increase in number of anti-cancer medicine brands, there can be difficulty in prescribing more cost effective brand to the patient.[3] Therefore it becomes increasingly necessary to examine issues of comparability across different pharmacological agents as well as individual user costs to influence the compliance of patients.
Aim: To evaluate the cost of anti-cancer drugs of different generic classes & different brand names & to analyse price variation among various anti-cancer drugs available in India.
Methodology: The Current Index of Medical Specialities android app containing the latest updates was used to analyze the prices of various anti-cancer drugs. The cost of each molecule of different strengths was tabulated and cost range and % price variation were calculated.
Results: A wide range of cost variations were seen among different categories of anticancer drugs with maximum price variation was observed in Zoledronic acid [18000%] and the least price variation was seen in Pemitrexate 500 mg.
Conclusions: Price control mechanism has an important role and is very much important to reduce the cost burden of treatment particularly in India.

KEYWORDS

comparison, anti-cancer drugs, Indian brands, Current Index of Medical Specialities

BACKGROUND

Rational use of medicines means patients received medicines appropriate to the clinical need at the proper dose for the proper duration & at the lowest cost. So it is very important for the prescriber to consider cost while writing the prescription along with other criterias.[1] Malignancy is associated with significant & long lasting health, social & financial burden. Pharmacological intervention is the main line of managing patients & anti-cancer drugs help in reducing morbidity & enabling patients to live a more meaningful & stable life with fewer relapses & reducing the need for hospitalization.[2] But anti-cancer drugs are costly & are the main reasons for poor compliance in India & with increase in number of anti-cancer medicine brands, there can be difficulty in prescribing more cost effective brand to the patient.[3] Therefore it becomes increasingly necessary to examine issues of comparability across different pharmacological agents as well as individual user costs to influence the compliance of patients.[4] This study was designed to evaluate the cost of anti-cancer drugs of different generic classes & different brand names & to analyse price variation among various anti-cancer drugs available in India.

MATERIALS & METHODS

The data was collected from the oncology department of a tertiary care hospital. The data consisted of names of brands along with contents, dosing & indications.

Current Index of medical Specialities [CIMS] android app containing the latest updates was used to analyse the prices of anti-cancer drugs prescribed in the hospital. Data about the cost of anti-cancer drugs was collected for all the strengths and dosage form.

1] Cost of a particular drug [per 10 tablets] of various strengths & dosage forms being manufactured by different companies was compared.
2] The drugs manufactured by only one company were also included and minimum and maximum cost was written as the same.
3] Difference between the maximum & minimum cost of same drug was also calculated [cost difference]
4] Percentage price variation were calculated for each

Following formula was used to calculate price variation [5]

Percentage price variation =

$$\frac{\text{(Price of most expensive brand – Price of least expensive brand)}}{\text{Price of least expensive brand}} \text{ X 100}$$

The study was discussed & approved in the departmental review meeting.

RESULTS

Tables 1, 2 & 3 show the cost variation of different anti –cancer drugs. It was observed that the number of brands varied from 2 to 16, with capecitabine having the maximum number of brands. There was substantial evidence in the prices of the different brands available. The maximum price variation was observed in Zoledronic acid [18000%]. Some of the most commonly used drugs were available at a subsidized cost in the hospital with some of them even being available for free. The least price variation was seen in Pemitrexate 500 mg.

Table 1: Cost analysis of anti-cancer drugs

Drug	No of brands included	Strengths	Min Cost [INR]	Max Cost [INR]	Cost Difference [INR]	% Price Variation
Aprepitant	7	125/80 mg	275	1550	1275	464%
Anastrozole	12	1 mg	50	560	510	1020%
Bleomycin	8	15 unit	350	529	179	51.1%
Carboplatin	12	450 mg	1100	2333	1233	112.10%
Carboplatin	12	150 mg	400	914	514	128%
Capecitabine	16	500 mg	250	1230	980	392%
Cisplatin	10	10 mg	50	68	18	36%
Cyclophosphamide	8	1 g	25	72	47	188%
Decarbazine	2	200 mg	150	425	275	183.33%
Decarbazine	2	500 mg	325	965	640	196.90%
Dexa	6	8 mg	free	6	6	
Docetaxel	9	20 mg	400	2400	2000	500 %
Docetaxel	9	80 mg	800	7300	6500	812.5 %
Docetaxel	9	120 mg	1100	17500	16400	1490 %
Doxorubicin	10	10 mg	50	170	120	240%
Doxorubicin	10	50 mg	150	870	720	480 %
Epirubicin	5	10 mg	150	640	490	326.665 %
Epirubicin	5	50 mg	550	2800	2250	409.09

Etoposide	10	100 mg	80	210	130	162.5%
5-FU	2	500 mg	5	28	23	460 %
Filgrastim	8	300 unit	275	1336	1061	385.81 %
Gefitinib Tablet	4	250 mg	350	2800	2450	700 %

Table 2: Cost analysis of anti-cancer drugs

Drug	No of brands included	Strengths	Min Cost [INR]	Max Cost [INR]	Cost Difference [INR]	% Price Variation
Gemcitabine	7	200 mg	200	1350	1150	575 %
Gemcitabine	7	1 g	550	5100	4550	827.27 %
Gemcitabine	7	1.4 g	850	8290	7440	875.29 %
Granisetron	8	1 mg	20	111	91	455 %
Ifosphamide	6	1 g	200	1322	1122	561 %
Ifosphamide	6	2 g	300	2700	2400	800 %
Imatinib	5	400 mg	300	3237	2937	979 %
Irinotecan	4	100 mg	300	3900	3600	1200 %
Leucovorine	2	50 mg	35	325	290	828.57 %
Letrozole	10	2.5 mg	20	100	80	400 %
Methotraxate	10	50 mg	35	340	305	871.42 %
Onden Tab	10	4 mg	Free	6	6	
Onden Inj.	8	4 ml	Free	7	7	
Oxaliplatin	8	50 mg	250	2360	2110	840 %
Oxaliplatin	8	100 mg	450	5450	5000	1111 %
Oxaliplatin	8	150 mg	650	6940	6290	967 %

Table 3: Cost analysis of anti-cancer drugs

Drug	No of brands included	Strengths	Min Cost [INR]	Max Cost [INR]	Cost Difference [INR]	% Price Variation
Paclitaxel	10	30 mg	200	1085	885	442 %
Paclitaxel	10	100 mg	300	4540	4340	1446 %
Paclitaxel	10	260 mg	750	9430	8680	1157 %
Paclitaxel	10	300 mg	1100	10870	9770	888.18 %
Pemetrexed	5	100 mg	500	5000	4500	900 %
Pemetrexate	5	500 mg	1500	1600	100	6.66 %
Port Needle			350	685	335	95.71 %
Ranitidine Tablet	4	150 mg	Free	4	4	-
Ranitidine Inj	3	150 mg	Free	4	4	-
Tamoxifen	8	20 mg	0.37	26	25.63	6927 %
Vincristine	5	1 mg	15	45	30	200 %
Vinblastin	5	10 mg	20	225	205	1025 %
Zoledronic acid	3	4 mg	100	1900	1800	18000 %

DISCUSSION:

Pharmacoeconomics is a branch of health economics which particularly focuses upon the cost and benefit of drug therapy thereby providing a guide for decision making on resource allocation and in planning process. Government & private healthcare institutes are targeting curtailment of expenditure on drugs for saving in healthcare costs.[1]

It is very much important for the prescribing doctors to know about the cost of drugs to reduce the price burden on the patient but there are not many studies carried out on the topic. So we undertook the above study.

In our study some of the most commonly used drugs were available at a subsidized rate or even for free at the hospital in order to reduce the patients expenditure on drugs. However when they were not available the price variation went up to almost 888% in drugs like Paclitaxel making them almost un affordable for the patients. Zoledronic acid showed the most price variation because of having less number of brands.

Drug prices are controlled according to drug price control act 2013 [DPCO]. Ceiling price of drugs are fixed by national pharmaceutical pricing authority [NPPA] government of India in accordance with DPCO 2013.[6] So far it has fixed ceiling prices of 509 drug formulations included in National list of Essential Medicines. Since May 2014 NPPA has notified prices of 251 formulations under DPCO 2013 resulting in benefit of Rs. 558 crore to consumers.[7]

Conclusions:

It is important to create awareness about cost effective prescription via –

1. Undergraduate teaching of price of medicines
2. Practical exercise of finding cheapest brand for each molecule
3. Providing doctors updated information of cost of various brands
4. Motivating pharmacists to dispense only those brands which the doctor has prescribed rather than those in which he has maximum benefits.
5. Prescribing generic drugs whenever possible to decrease expenditure of patient on drug.

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