

RESEARCH ARTICLE

Cost analysis of drugs used for respiratory and gastrointestinal diseases – A pharmaco-economic study

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ABSTRACT

Background: Economic evaluation of pharmaceutical products is a must in developing countries like India as it helps in decision-making process and manufacture of cost-effective medicine. Pharmaco-economic studies especially help lower socioeconomic for effective planning of their health budget. Very few studies comparing the cost-effectiveness of respiratory and gastrointestinal in our country; hence, this study was taken up to provide useful data. **Aim and Objective:** This study aims to evaluate existing price variations of different single used drugs under various brand names manufactured by different pharmaceutical industries in respiratory and gastrointestinal diseases. **Materials and Methods:** A retrospective observational study was conducted for a period of 1 year by reviewing the cost of maximum and minimum price of a particular brand, % variation in maximum and minimum price of drugs, and Jan Aushadhi for generic drugs. Results were calculated by proper statistical analysis. **Results:** Brand price variations were found significantly. Three drugs showed price variation of <100%, 15 drugs had price ranging from 100 to 1000%, and six drugs had price variation greater than 1000% when compared with generic brands. **Conclusion:** Regular checks by government authorities can ensure all brand prices within the range of patients financial resources. Commonly used drugs from essential drug list, pricing policy should be implemented by drug price control organization.

KEY WORDS: Cost Analysis; Pharmaco-economics; Respiratory System Drugs; Gastrointestinal drugs

INTRODUCTION

Pharmaco-economics is the science that deals with quality-of-life assessment to optimum drug therapy and health outcomes. Pharmaco-economics can be defined as the branch of economics that uses cost minimization, cost-utility analyses, cost benefit, cost-effectiveness, cost minimization to compare pharmaceutical products, and treatment strategies. It is a challenge for health professional to provide minimum cost to patients and improve quality of patient care given the limitations. Improvement in


quality of life can be achieved by pharmaco-economics studies as expensive drugs are being developed.^[1]

In pharmaco-economic methods, cost-minimization analysis is the simplest method that compares the two interventions when the clinical outcomes of both are equivalent.^[2] There very few pharmaco-economics studies and as there is wide variation in brand price, this study focused on drugs used in sing therapeutic area.^[3]

The present study looks at cost-minimization analysis with given prescription pattern.

MATERIALS AND METHODS

A retrospective study was conducted by the Pharmacology Department in Rajiv Gandhi Institute of Medical Sciences,

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Adilabad. A total of 150 case sheets were enrolled in the study between February 2019 and January 2020 by reviewing the prescriptions from the outpatient departments of general medicine. Study was conducted after taking Institutional Ethics Committee permission.

Inclusion criteria are patients with respiratory tract and gastrointestinal infections of either sex attending as outpatients. Patients were excluded from the study if they had one of the following exclusion criteria: (1) Children and pregnant women, (2) patients with severe ailment, and (3) patients who were shifted to ICU.

Most commonly used drugs for the treatment of respiratory and gastrointestinal diseases were chosen for cost-minimization analysis.

For respiratory tract infections and gastrointestinal diseases, important drugs used are antibiotics from cephalosporins, fluoroquinolones, macrolides, tetracyclines group, bronchodilators from methylxanthines group (theophylline), inhaled glucocorticosteroids, nonsteroidal anti-inflammatory drugs, 2nd generation antihistaminics, antiemetics, antacids like H2 blockers, gastric acid secretion inhibitors proton-pump inhibitors, anticholinergic drugs, antimalarial drugs, and nitroimidazole metronidazole which were chosen for the study.

Drug today and current index of medical specialties 2019 is best source and was used for prices and Jan Aushadhi for generic drugs. Parameters such as maximum price brand, minimum price brand and % variation in maximum and minimum price of drug were used for comparison of drugs based on brand cost. Total cost of drug for the duration of treatment was also used

The following indicators were analyzed:

Percentage difference in price between maximum and minimum.^[4]

= [(Drug with maximum price brand-Drug with minimum price brand)/(Drug with minimum price brand)] × 100

RESULTS

The findings of the present study are depicted in Tables 1-4.

DISCUSSION

Table 1, result indicates that there is a significant difference in price variation from maximum and minimum price between brands. Three drugs showed price variation of less

Table 1: Comparison of drugs based on brands cost

Drug and dose	Number of brands	Drug with maximum price brand (Rs.)	Drug with minimum price brand (Rs.)	% variation in maximum and minimum price of drug
Ceftriaxone 1 g	5	60	15	300
Cefotaxime 1 g	5	37	15	146.6
Amoxiclav 1.2 g	5	131	40	227.5
Amikacin 500 mg	5	50	6	733.3
Metronidazole 500 mg/100 mL inj.	5	22	7	214.2
Ciprofloxacin 2 mg inj.	5	96	7	1271.4
Doxycycline 100 mg tablet	5	7	1	600
Artesunate 60 mg inj.	5	204	15	1260
Primaquine 15 mg tab.	5	33	1	3200
Dicyclomine 10 mg inj..	5	6	1	500
Paracetamol 500 mg	5	1.5	1	50
Pantoprazole 40 mg inj.	5	48	12	300
Diclofenac sodium 25 mg inj.	5	22	2	1000
Azithromycin 500 mg tab.	5	23	8	187.5
Chlorpheniramine 2 mg tab.	5	5	1	400
Atropine 0.6 mg inj..	5	8	2	300
Ondansetron inj. 2 mL	5	12	1	1100
Ranitidine 25 mg	5	4	1	300
Etofylline + Theophylline inj.	5	3	2	50
Salbutamol 2 mg	5	5	1	400
Budesonide 0.5 mg	5	19	10	90
Hydrocortisone 100 mg inj.	5	40	18	122.2
Ambroxol 30 mg/5 mL syrup	5	98	17	476.4
Levocetirizine 2.5 mg/5 mL syrup	5	136	3	4433.3

Table 2: Drug names and cost prices of various brands

Drug name	Brand-1/cost (INR)	Brand-2/cost	Brand-3/cost	Brand-4/cost	Jan Aushadhi/generic/cost
Ceftriaxone 1 g	Monocef/60.00	Taxone/:53.00	Ceftrian/:56/00	Zetri/15.00	22
Cefotaxime 1 g	Taxim/37:00	Cefentral/30.00	Tox/25.00	Biotax/15.00	15
Amoxiclav 1.2 g	Draclav/140	Ropclav/131	Amoxsia-cv/129	Amentoclav/119	55
Amikacin 500 mg	Mikacin/46	Macmika/45	Amitax/49	Amicin/50	25
Metronidazole 500 mg/100 mL inj.	Metrogyl/22	Flagyl/11	Aristogyl/10	Metro/12	7
Ciprofloxacin 2 mg inj.	Cifran/55	Ciprobid/61	Alcipro/96	Ciprodac/39	7
Doxycycline 100 mg tablet	Minicycline/2	Codox/2	Doxypal/7	Doxt/7	1
Artesunate 60 mg inj.	Maxonate/174	Nilsunate/188	Simate/160	Artzom/204	Not available
Primaquine 15 mg tab.	Primarid/33	Primaline/4	Primec/5	Malirid ds/6	1
Dicyclomine 10 mg inj.	Cyclopam/6	Meftalspas/5	Spas/5	Coliza/5	0.30 paise
Paracetamol 500 mg	Calpol/1	Dolo/1.50	Febrex/1	P-500/1	0.30 paise
Pantoprazole 40 mg inj.	Pan/45	Pantocid/48	Pantodac/43	Pantop/43	12
Diclofenac sodium 25 mg inj.	Voveran/21	Diclotal/5	Gudgesic/22	Dicloran/4	2
Azithromycin 500 mg tab.	Azithral/23	Azee/23	Azax/21	Zady/21	8
Chlorpheniramine 2 mg tab.	Wikoryl/4	Solvin/5	Flucold/3	Chestoncold/3	1
Atropine 0.6 mg inj.	Tropine/4	Atro/2	Malano/6	Tropensa/8	2
Ondansetron inj. 2 mL	Emeset/12	Ondem/13	Vomikind/3	Zofer/12	0.40 paise
Ranitidine 25 mg	Rantac/4	Aciloc/4	Rantac/4	Ranitin/4	0.40 paise
Etofylline + Theophylline inj.	Dexophylline/3	Suphylline/2	Regaphylline/2	Etobrosmin/2	2
Salbutamol 2 mg	Salbetol/2	Broncocet/2	Asthalin/5	Asthavent/4	0.005 paise
Budesonide 0.5 mg	Budocort/18	Budez/19	Bunase/11	Budeste/10	11
Hydrocortisone 100 mg inj.	Primacort/40	Lycortin S/37	Cort S/39	Acucort/39	18
Ambroxol 30 mg/5 mL syrup	Mucolite/94	Ambrodil/58	Amrolite/68	Ascorills/98	17
Levocetirizine 2.5 mg/5 mL syrup	Levocet/47	Teczine/80	Xyzal/136	Lcz/23	3

Table 3: Cost of drugs for prescription

Most common diseases of GIT and respiratory tract infections	Total cost of drugs for prescription of 7 days
COPD	1610
Pleural effusion	602
Asthma	2100
Bronchopneumonia	3346
Acute bronchitis	1070
Lower lobe bronchiectasis	1820
Lung abscess	2073

COPD: Chronic obstructive pulmonary disease

Table 4: WHO core prescribing indicators

WHO core indicators	Percentage of prescriptions (%)
Average number of drugs for one prescription	6.81
Percent of antibiotics for one prescription	23.64
Percentage of drugs prescribed from EDL	34

than 100%, 15 drugs had price ranging from 100 to 1000%, and six drugs had price variation greater than 1000% when compared with generic brands. Results show that there is

a significant variation in brand price. The price control mechanisms in India have not been successful.^[5]

From Table 3 and 4, total cost of prescription for the duration of treatment was high and expenditure on antibiotics was approximately 23.64% of the prescription. This can be due to the absence of generic drugs, polypharmacy, and cost of antibiotics in prescription. The study conducted by Veena *et al.*, 2012, showed only 16.94% of antimicrobials.^[6] Over use of antibiotics may result in drug resistance and increased cost.

From Table 4, average number of drugs for one prescription and percentage of antibiotics for one prescription was high as stated by WHO and study conducted by Babar *et al.*, 2014.^[7] Polypharmacy can be prevented by stopping the use of potentially inappropriate drugs.

Majority of prescriptions had brand names for analgesics, antibiotics, acid peptic disease drugs, bronchodilators, corticosteroids, and antitussives and cost was higher. To improve patient compliance, generic drugs use should be encouraged. Audit of prescription using the accepted methods on drugs utilization needs to perform in an Indian hospital set up.^[8]

Bioequivalence of generic medicines and popular brands should be compared and result published. In the national list of essential medicines, commonly used drugs for respiratory and gastrointestinal should be periodically checked by drug price control organization (DPCO).

CONCLUSION

Government authorities need regular checks to ensure all brand prices within the range of patients financial resources. Transparency in fixing maximum retail price by the manufacture can reduce financial burden on patient.

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