

Economic evaluation of antibiotic prescriptions: a cost minimization analysis

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ABSTRACT

Objective of the study was to perform a cost minimization analysis of antibiotic prescriptions in pediatric cases. This was a prospective observational study conducted in the pediatric department of a teaching hospital. A total of 209 prescriptions, of both outpatients and inpatients, containing antibiotics were analyzed. Top five of the commonly prescribed antibiotics in this study were chosen as examples to illustrate the cost difference between the branded and generic versions. This study has shown a very significant difference of prices between branded and generic drugs. The cost of branded drugs prescribed was 20% to 218% more than the generic versions.

INTRODUCTION

Pharmacoeconomics is a branch of health economics which particularly focuses upon the costs and benefits of drug therapy (Walley and Haycox, 1997). A knowledge of pharmacoeconomics is therefore vital for doctors to promote rational prescribing. Drugs account for a significant proportion of the total healthcare cost. The writing of a prescription is the most common therapeutic intervention in medicine (Kulkarni, Dalvi, *et al.*, 2009). Consumption decisions in healthcare are taken by the doctor and not by the consumer (the patient).

The prescribing decisions of doctors are often influenced by the gifts and incentives offered to them by the pharmaceutical companies. Ignorance about the cost of drugs (specially the branded drugs) is another reason for prescription of costly drugs (Allan, Lexchin, *et al.*, 2007). Doctors have an ethical obligation to consider the cost of the drugs they prescribe. Costly drugs often force the poor people to give up the treatment itself or to sacrifice other essential needs. The need to minimize the cost of drug therapy is urgent as the prices of many drugs are rising sharply.

Generic drugs can reduce the healthcare expenditure significantly since their prices are substantially lower than branded drugs (King *et al.*, 2002, Singal *et al.*, 2011). However, physicians are apprehensive regarding the quality of generic drugs (Tilyard *et al.*, 1990, Biswas *et al.*, 2000).

Although the generic medicines are bio-equivalents of their innovator branded counterparts, these are widely believed as inferior in their therapeutic efficacy and quality to branded products (Shrank *et al.*, 2009, Hassali *et al.*, 2004, Shafie *et al.*, 2008, Figueiras *et al.*, 2008, Kjoenniksen *et al.*, 2006).

Marketing practices adopted by manufacturers also propagate the belief that generics are of inferior quality (Joncheere *et al.*, 2003). Studies have shown that there is no evidence of superiority of brand preparations to generic drugs (Singal *et al.*, 2011, Kesselheim *et al.*, 2008).

In fact the Medical Council of India (MCI) has issued a directive to doctors in February 2013 to prescribe drugs by generic names as far as possible. Pharmacoeconomic studies help in highlighting the price difference between generic and branded drugs. This would sensitize doctors to reduce the financial burden on the patients.

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There are four common types of study in pharmacoeconomics (Walley and Haycox, 1997):

1. Cost minimization analysis (CMA): This should be used only when the health benefits obtained from two alternative therapies are identical and therefore need not be considered separately. For example, comparing the costs of two different brands of the same drug or comparing the cost of a branded drug with its generic form. Generic preparations usually cost lesser than their branded forms, while providing the same health outcomes. The objective of this method is to select the least costly among multiple equivalent interventions.
2. Cost effectiveness analysis (CEA): Such analysis compares the unit of effectiveness (Eg: number of years of life saved or the percentage lowering of glucose level) with the cost of treatment. A treatment can be termed cost effective if it has an outcome that is worth its corresponding cost in relation to alternative therapies.
3. Cost utility analysis (CUA): The defined outcome of the study and the cost to reach that outcome is measured in monetary terms. Outcome in CUA is measured in terms of changes in patient wellbeing (utility).
4. Cost benefit analysis (CBA): This analysis attempts to calculate the associated economic benefit of an intervention (Eg: monetary value of returning a worker to employment earlier). Both costs and benefits are reduced to their monetary equivalents. Comparisons can be made between very different areas. Eg: cost benefits of expanding university education (improved productivity) compared to establishing a back pain service (increased productivity by returning patients to work). This is not widely used in health economics.

Objective

To do a cost minimization analysis of antibiotic prescriptions in pediatric cases.

MATERIALS AND METHODS

This was a prospective observational study conducted in the pediatric department of a teaching hospital. A total of 209 prescriptions, of both outpatients and inpatients, containing antibiotics were analyzed. Antibiotics were chosen for this study of cost minimization analysis as they are one of the most commonly prescribed classes of drugs. Top five of the commonly prescribed antibiotics in this study were chosen as examples to illustrate the cost difference between the branded and generic versions. The brands prescribed were noted down and their market price (maximum retail price) was obtained from the hospital pharmacy. The prices of the generic versions of these antibiotics were obtained from the official price list of generic medicines put up by the department of pharmaceuticals, government of India, on the website www.janaushadhi.gov.in (accessed on 9 April, 2013).

The prices of branded and generic versions of each antibiotic are presented in the form of bar charts for easy comparison. The percentage of price difference between each of the prescribed brands and its generic version was calculated and presented in the results section.

RESULTS

The costs of branded and generic versions of the five most commonly prescribed antibiotics in this study are shown in figures 1 – 5 below. Table-1 shows a summary of all the prescribed brands, their frequency of prescription, costs and the percentage of price difference in comparison to generic versions.

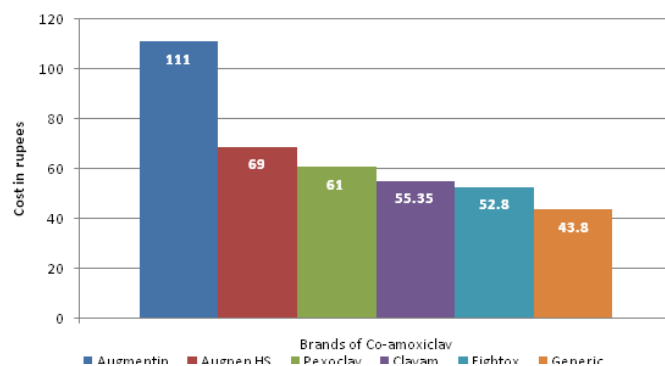


Fig. 1: Cost comparison of branded versus generic co-amoxiclav syrup 30 ml.

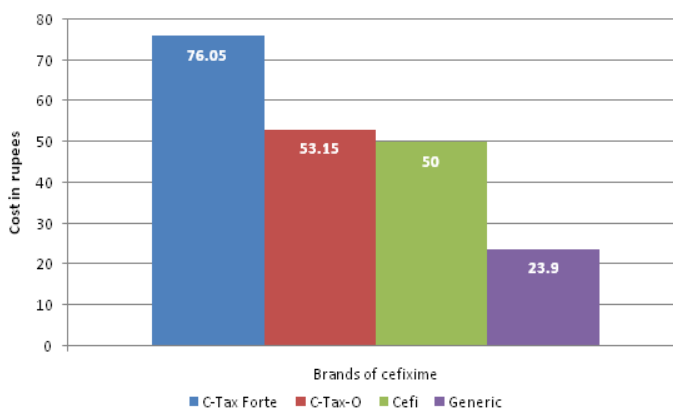


Fig. 2: Cost comparison of branded versus generic cefixime syrup 30 ml (50 mg/5 ml).

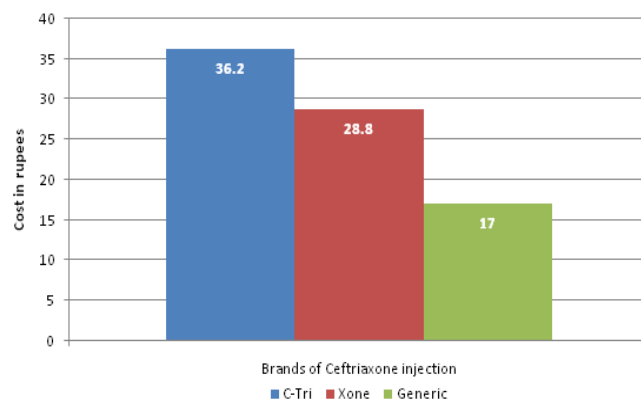


Fig. 3: Cost comparison of branded versus generic ceftriaxone injection 250 mg vial.

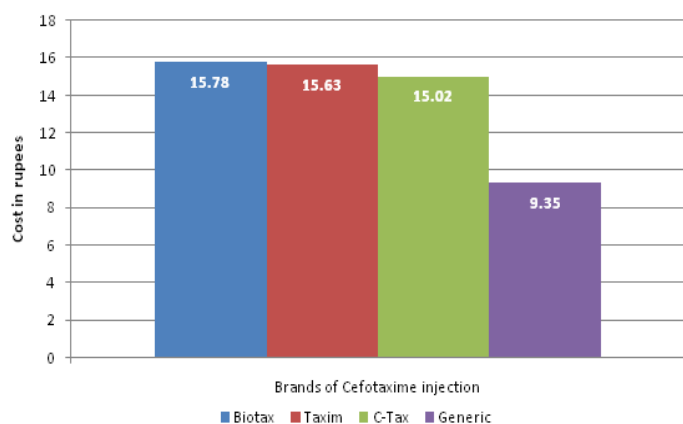


Fig. 4: Cost comparison of branded versus generic cefotaxime injection 250 mg vial.

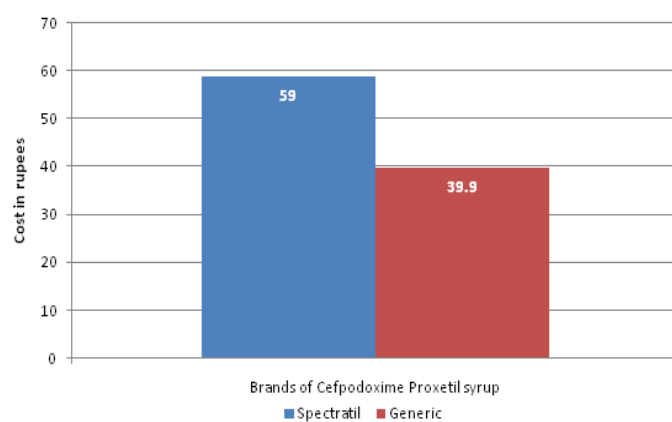


Fig. 5: Cost comparison of branded versus generic cefpodoxime proxetil syrup 30 ml.

Table. 1: Cost comparison of commonly prescribed antibiotics and their brands in this study.

Name of the drug	No. of Prescriptions	Brand name	No. of Prescriptions	Brand price in rupees	Generic price in rupees	% of cost difference between brand and generic		
Co-amoxiclav (dry syrup 30 ml)	78	Augpen HS	52	69.00	43.80	57.53		
		Pexoclav	12	61.00		39.26		
		Fightox	7	52.80		20.54		
		Clavam	4	55.35		26.36		
		Augmentin	3	111.00		153.42		
Cefixime (syrup 30 ml)	46	C-Tax O	32	53.15	23.90	122.38		
		Cefi	10	50.00		109.20		
		C-Tax forte	4	76.05		218.20		
		C-Tri	34	36.20		17.00	112.94	
Ceftriaxone (250 mg injection)	36	Xone	2	28.80	17.00	69.41		
		Spectratil	24	59.00		39.90	47.86	
Cefpodoxime (syrup 30 ml)	24	Spectratil	24	59.00	39.90	47.86		
		Taxim	11	15.63			9.35	67.16
		C-Tax	4	15.02			9.35	60.64
Cefotaxime (250 mg injection)	17	Biotax	2	15.78	9.35	68.77		
		C-Tax	4	15.02		9.35	60.64	

DISCUSSION

Co-amoxiclav syrup was the commonest antibiotic prescribed, having a generic price of Rs.43.80. The commonest brand of co-amoxiclav prescribed was Augpen HS having a maximum retail price (MRP) of Rs.69. Thus it was 57.53% costlier than its generic version. The costliest brand of co-amoxiclav prescribed was Augmentin, having an MRP of Rs.111 which was 153% costlier than its generic version. The range of cost difference was between 20.54% to 153.42% among various brands of co-amoxiclav as compared to its generic version.

Among cephalosporins, cefixime syrup was the most commonly prescribed, having a generic price of Rs.23.90 per 30 ml bottle. Its branded versions were costlier by 109.20% to 218.20%. Thus, all the prescribed brands cost more than double of the generic form. C-Tri was the commonest prescribed brand of ceftriaxone injection whose cost was more than double (112.94% more) of the generic form. All the prescriptions of cefpodoxime (syrup 30 ml) were of a single brand i.e., Spectratil. Its cost was 47.86% more than the generic version. In case of cefotaxime injection also, the prescribed brands were costlier by 60.64% to 68.77% over the generic form.

CONCLUSIONS

This study has shown a very significant difference of prices between branded and generic drugs. The cost of branded drugs prescribed was 20% to 218% more than the generic versions. This means that the patients are spending much more on their treatment than what is necessary. To reduce this wastage of money, the following suggestions are made:

1. Doctors must make a conscious effort to prescribe drugs by generic names only (as directed by the Medical Council of India).
2. In case of non-availability of generic drugs, the most economical among the branded drugs should be prescribed by doctors.
3. The government must make it compulsory for all pharmacies/medical shops to stock generic versions of all essential drugs. Only then, they should be licensed.

It is hoped that pharmacoeconomic studies like this one, will help sensitize doctors to the cost of branded medicines. That is the most vital step to reduce the financial burden on the patients.

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