A STUDY ON THE PRICE VARIABILITY AMONG THE ORAL ANTIBIOTICS AVAILABLE IN A WESTERN REGION HOSPITAL - A CONTEXT OF NEPAL

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ABSTRACT

Objective: The objective of the research was to obtain the picture of price variability among the different oral antibiotic drugs in hospital pharmacy and their economic impact on patients. Methods: Computer data base were used to study the prices and the units of oral antibiotics sold in pharmacy department of western Nepal hospital. Many brands of generic group were studied to calculate the percentage price variation. Brands were classified into high cost, cheap and mid range products. Impact of number of brands on percentage price variation was calculated. The cost burden by the patient if costliest and the cheapest brands were prescribed for managing clinical condition was calculated. Results: Percentage price variability of 30 brands was 0 - 25% and for 24 brands it was 25.1 -50%. For 15 brands percentage price variability was more than 100%. Costliest brands were preferentially prescribed over the cheaper alternatives. The percentage price variation (range) increases as the number of brands increased for any drug Conclusion: It was seen that percentage price variation was higher among some drugs and this percentage price variation might result in bigger difference in cost of management of infections, if costlier brands were prescribed. It was also observed that costlier brands were preferred more and there is a need to formulate policy at the Hospital level to address these issues.

Keywords: Antibiotics, Brands, Price variation, Hospital pharmacy.
1. INTRODUCTION
1.1 Background
The difference in price between various brands of the same drug is too wide. 25.2% of the Nepali population is below poverty line and 60% is middle class. People are purchasing drugs out-of-pocket, so a control on price of drug is essential. As pharmacists, we have a unique responsibility to study and communicate the price variation between brands and to better understand the effect of prices on prescription behavior. The rational use of drugs requires that “Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community” [1]. Rational drug use (RDU) is conventionally defined as the use of an appropriate, efficacious, safe and cost-effective drug given for the right indications in the right dose and formulation, at right time intervals (2). The promotion of rational drug use involves a wide range of activities such as adaptation of the essential drug concept, continuous training of health professionals and the development of evidence based clinical guidelines. Unbiased and independent drug information, consumer education and regulatory strategies are also vital to promote rational drug use (2). The irrational use leads to ineffective and unsafe drug treatment, worsening or prolonging of illness, and adverse drug reactions (3). We embarked on this study to ascertain the degree of price variation among brands of the oral antibiotics in order to understand the market and marketing dynamics of the Nepalese pharmaceutical market. Healthy competition in trade always provides a better option to the consumer but these does not hold right for the medicines as person who buys the medicines has very little choice in selection of the drugs. High cost of medicines has economic implications for the patients and also the patient compliance significantly depends on the cost of the medicines prescribed. In fact, several studies have indicated that therapeutic compliance is influenced by drug prices (4). Large number of brands available for a drug is a matter of concern, since patients get confused, as well as random brand substitution takes place, with disregard to bioequivalence, therapeutic equivalence and cost of treatment (5).

2. MATERIALS AND METHODS
Prices of oral antibiotics included in the study were obtained from computer data base of hospital pharmacy department. The selling cost of a particular drug manufactured by different companies in same strength available in hospital pharmacy department was compared.
Exclusion criteria
Single brand of a drug without any competitor’s brand.
Parental antibiotics were not included in this study.
The percentage variation in price was calculated using the following formula [3]
Percentage variation = \frac{\text{Price of most expensive brand} - \text{Price of least expensive brand}}{\text{Price of least expensive brand}} \times 100

The drugs were classified into five categories depending on the percentage price variation as follows: 0-25%, 25.1-50%, 50.1-75%, 75.1-100% and more than 100% price variation. The most prescribed brands were found out by analysis of number of prescription of oral antibiotics filled in hospital pharmacy. The costliest, the cheapest and the mid range brands were categorized by comparing with the price of all the brands of that particular drug. Four drugs viz., cefpodoxime, cefuroxime axetil, levofloxacin, ofloxacin were selected since they had more than 100% price variation. The cost to be incurred by a patient was calculated for costliest and cheapest brand.

3. RESULT
The prices of 32 oral antibiotic drugs available in the hospital pharmacy of a hospital were compared. The percentage of price variation was analyzed. A total of 117 brands of these drugs were available and prescribed by clinicians. The number of brands available in various categories based on the percentage price variation is presented in [Fig 1].

![Figure 1- Number of brands with percentage variation](image-url)
Thirty brands were available in the category of 0-25% price variation. This was the largest group compared to other categories of price variation. It was found that costliest brands were preferably prescribed over cheaper brands. [Table 1]

Table 1- Frequently prescribed costliest, cheapest and mid-range brands.

<table>
<thead>
<tr>
<th>Cheapest brand preferred</th>
<th>Mid range brand preferred</th>
<th>Costliest brand preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefpodoxime 200 mg, 100 mg</td>
<td>Ciprofloxacin 500 mg, 750 mg</td>
<td>Amoxicillin + Clavulanate potassium 375 mg</td>
</tr>
<tr>
<td>Cefixime 200 mg</td>
<td>Levofloxacin 500 mg</td>
<td>Azithromycin 500 mg</td>
</tr>
<tr>
<td>Clarithromycin 500 mg</td>
<td>Amoxicillin + Clavulanate 625 mg</td>
<td>Erythromycin 250 mg</td>
</tr>
<tr>
<td>Ciprofloxacin 500 mg</td>
<td>Cefuroxime 500 mg</td>
<td>Erythromycin 500 mg</td>
</tr>
<tr>
<td>Ofloxacin 200 mg, 400 mg</td>
<td>Norfloxacin 100 mg</td>
<td>Amoxicillin+ Clavulanate potassium 1000 mg</td>
</tr>
<tr>
<td>Ampicillin 250 mg</td>
<td>Ampicillin + Cloxacillin 500 mg</td>
<td>Amoxicillin- 250 mg, 500 mg</td>
</tr>
<tr>
<td>Ampicillin 500 mg</td>
<td>Chloramphenicol 500 mg</td>
<td>Amoxicillin 125 mg</td>
</tr>
<tr>
<td>Levofloxacin 250 mg</td>
<td>Cefuroxime 125 mg</td>
<td>Cefuroxime 250 mg</td>
</tr>
<tr>
<td>Norfloxacin 400 mg</td>
<td>Clarithromycin 250mg</td>
<td>Cefuroxim and potassium clavulanate 325 mg</td>
</tr>
</tbody>
</table>

A big difference was found when costlier and cheaper brands were used for managing illness by using antibiotics regimen as shown in [Table 2]

Table 2- Variation in cost in managing pathological condition with various brands of same drug

<table>
<thead>
<tr>
<th>Drug dosage form</th>
<th>Indication</th>
<th>Dosing and frequency</th>
<th>Total cost for costliest drug (US$)</th>
<th>Total cost for cheapest drug (US$)</th>
<th>Difference in price (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefuroxime-500</td>
<td>Bronchitis</td>
<td>BID for 7 days</td>
<td>20$</td>
<td>6$</td>
<td>14$</td>
</tr>
<tr>
<td>Levofloxacin 500 mg</td>
<td>Urinary tract infection</td>
<td>Once daily for 7 days</td>
<td>12$</td>
<td>1$</td>
<td>11$</td>
</tr>
<tr>
<td>Ofloxacin 400 mg</td>
<td>Typhoid</td>
<td>Twice daily for seven days</td>
<td>7$</td>
<td>2$</td>
<td>5$</td>
</tr>
</tbody>
</table>
Cefpodoxime -500 mg Pneumonia Twice daily for fourteen days 17.6$ 5$ 12.6$

4. DISCUSSION

In this study it has been noted that costliest brands of drugs were mostly prescribed than their cheaper counterparts even though there is no evidence that costly brands are better in terms of bioavailability or efficacy. This tendency of prescribing costliest brand particularly in antibiotic class which are already expensive may contribute to poor compliance which in turn might result in increased drug resistance. Employing the use of cheaper options in disease management makes the treatment to be more affordable and successful. In a study reported by Das.S.C et al out of 7 drugs studied costliest bands were sold more than cheapest brands in case of 5 drugs and this shows the tendency to prescribe costliest brands among the prescribers (5). It was observed that percentage price variation was higher among some drugs and this percentage price variation might result in bigger difference in cost of management of infections, if costlier brands were prescribed. Costlier brands were preferred more and there is a need to formulate policy at the Hospital level to address these issues (8). As the number of brands for a drug increases percentage price variation also shows concurrent increase. Costliest brands were preferred over cheaper brands and this shows the need for educating physician and further study of this issue. At the hospital level authorities and concerned committees have to frame policies on these aspects. There is a need for concerted action from regulatory authorities, doctors, pharmacists and general public at large to address this issue of antibiotic price variation (10).

5. CONCLUSION

There is concurrent increase in percentage price variation with the increase in number of brand of drugs. The average percentage price variation of different brands of the same drug available in hospital pharmacy is very wide. The preference of costliest brands over cheaper brands is seen and this shows the need for educating physician and further research should be done in this context. The hospital level authorities and concerned committees have to frame policies on these aspects and there is a need for concerted action from regulatory authorities, doctors, pharmacists and general public at large to address this issue of antibiotic price variation.
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