Trends in prescribing antimicrobials in an ENT outpatient department of a tertiary care hospital for upper respiratory tract infections

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ABSTRACT

Background: The drug utilization study identifies the problems that arise from drug usage in healthcare delivery system and highlights the current approaches to the rational use of drugs.

Objective: To study the trends in prescribing antimicrobials in an ENT outpatient department (OPD) of a tertiary care hospital for upper respiratory tract infections (URTI).

Materials and method: An observational study was conducted in the OPD of ENT at Bapuji Hospital, Davangere, Karnataka, India from May to July 2011. Prescriptions of all patients were collected; relevant information entered in a preformed proforma and analyzed using the drug utilization 90% [(DU-90%)] method. The results were presented in percentages and analyzed using DU-90% method.

Result: A total of 300 prescriptions were analyzed. The common cases for which antimicrobials prescribed were infections like pharyngitis, acute suppurative otitis media (ASOM), chronic suppurative otitis media (CSOM), tonsillitis, laryngitis. It was noted that 142 patients (47.33%) received amoxicillin alone, 52 patients (17.33%) received combination of amoxicillin and clavulanic acid, 43 patients (14.33%) received cefixime, 40 patients (13.33%) received cefuroxime and 23 patients (7.66%) received azithromycin, levofloxacin and other antimicrobials.

Conclusion: The present study showed that among the various antimicrobials used, only four antimicrobials figured in DU-90% segment which were amoxicillin, combination of amoxicillin and clavulanic acid and cephalosporins like cefixime and cefuroxime. Though azithromycin and levofloxacin are also frequently used drugs in upper respiratory tract infections, in this study they did not figure in the DU-90% segment.

KEY WORDS: Antimicrobials, ENT, upper respiratory tract infection, DU-90%.

INTRODUCTION

Drug utilization studies are pre-requisites for the formulation of drug policies. They also offer useful methods for teaching and training in drug therapy. It is well known that indiscriminate use of drugs results in unwanted adverse effects, drug interactions and poses difficulties in diagnosis.

Manufacturers create artificial demands of unwanted drugs and drug combination through competitive sale promotions. Moreover, the prescribing behavior of clinicians depends upon information from various sources like academic literature, professional colleagues, government regulations and commercial publicities.[¹] The drug utilization study identifies the problems that arise from drug usage in healthcare delivery system and highlights the current approaches to the rational use of drugs.[²]

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Drug utilization research was defined by WHO in 1977 as “the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences”. Drug utilization review is defined as authorized, structured and continuing program that reviews, analyses and interprets the pattern of drug use against predetermined standards.\(^3\)

Respiratory tract infection (RTI) is defined as any infectious disease of the upper or lower respiratory tract. Upper respiratory tract infections (URTs) include common cold, laryngitis, pharyngitis/tonsillitis, acute rhinitis, acute rhinosinusitis and acute otitis media. Lower respiratory tract infections (LRTIs) include acute bronchitis, bronchiolitis, pneumonia and tracheitis. Antibiotics are commonly prescribed for RTIs in adults and children in primary and tertiary care.\(^4\)

There is evidence that antibiotics are often used inappropriately to treat URTIs.\(^3\) Antimicrobial agents deserve their place as one of the most powerful pillars of modern medical care. These drugs along with vaccines represent most potential agents in preventing mortality as well as morbidity.

The problem of overuse of antimicrobials is a global phenomenon. In India, the prevalence of use of antimicrobials varies from 24% to 67%.\(^6\) According to a recent study, acute respiratory infections are the reason for 75% of the antibiotic prescriptions each year and are the most frequent reason for seeking medical attention. This occurs despite the fact that in most cases of URIs, antibiotics confer little or no benefit.\(^7\)

Some concerns about overuse of antibiotics are that it leads to unnecessary cost and the potential of adverse effects for the individual taking the antibiotic. But even more important concern is the adverse effect on public health due to the development of antibiotic resistant bacteria.\(^8\) Hence the objective of this study was to understand the antimicrobials utilization in the outpatient department of ENT at Bapuji Hospital Davanagere, Karnataka, India using the drug utilization 90% [DU-90%].

### MATERIALS AND METHODS

A prospective study was conducted in the outpatient department of ENT at Bapuji Hospital Davanagere, Karnataka, India, from May to July 2011. Prescriptions of all patients were collected, relevant information entered in a preformed proforma and analyzed. Patient details such as age, sex, diagnosis and drugs prescribed were recorded. The Institutional Ethics Committee’s approval was obtained before starting the study.

Prescriptions were analyzed using the DU-90% method. The DU-90% is an inexpensive, flexible and simple method for assessing the quality of drug prescribing in routine health care. The number of products in the DU-90% segment and adherence to prescription guidelines may serve as general quality indicators. The method may be adopted to provide comparison between primary health centers, hospitals or regions regarding the quality of drug prescribing.\(^9\)

Following quality indicators of drug use were included:

1. Average number of drugs per prescription (encounter),
2. Percentage of drugs prescribed by generic names,
3. Antimicrobial utilization was analyzed by accounting for the drugs used in the 90% Segment [DU- 90%],
4. Drug utilization pattern of antimicrobials in upper respiratory tract infections like pharyngitis, acute suppurative otitis media (ASOM), chronic suppurative otitis media (CSOM), tonsillitis and laryngitis were analyzed.

### RESULTS

A total 300 prescriptions were analyzed. The patients’ demographic characteristics, antimicrobial formulations prescribed, quality indicators of drug use and concomitant medications are shown in Table 1. The common cases for which antimicrobials prescribed were infections like pharyngitis, ASOM, CSOM, tonsillitis and laryngitis. Out of the total 300 prescriptions, 161 were for male patients and 139 were for female patients. Total 638 drugs were prescribed which included oral and parenteral preparations. Oral preparations were prescribed as single drug preparation or fixed dose combinations (FDC). Most of the prescriptions were for five to seven days duration.

Categorization of prescriptions based on age of the patient revealed that out of 300 prescriptions, 112 (37.33%) were for patients with less than 15 years of age, 104 (34.66%) were given for patients between 15-60 years of age and 84 (28%) prescriptions were given for patients with more than 60 years of age.

Concomitant medications like non-steroidal anti-inflammatory drugs (NSAIDs) and antihistaminics were also prescribed for fever, throat pain, headache and myalgia. Among 300 patients, 188 (62.66%) were prescribed NSAIDs like paracetamol, diclofenac and nimesulide whereas 142 (47.33%) patients were prescribed antihistaminics.

Amongst eight different antimicrobials used, first four antimicrobials shown in table 2 were found in the DU 90% segment. Table 3 shows the frequency of different drugs used in various URIs. Amoxicillin alone was prescribed most frequently for pharyngitis. Whereas combination of amoxicillin and clavulanic acid was prescribed most frequently for tonsillitis. It was noted that, in our tertiary care hospital, amoxicillin was most frequently used for patients under the age group of 15 years. Whereas amoxicillin and clavulanic acid combination was preferred for patients of 16-60 years of age. Age wise frequency distribution of drugs constituting DU 90 % showed significant p value (<0.001) with $\chi^2=28.62$. 

Antimicrobials for Upper Respiratory tract infections
Table 1: Patient’s demographic characteristics and drug use

<table>
<thead>
<tr>
<th>Total number of prescriptions screened</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>161 (53.66%)</td>
</tr>
<tr>
<td>Females</td>
<td>139 (46.33%)</td>
</tr>
</tbody>
</table>

Age (years)  
<15           
15-60         
> 60          

<table>
<thead>
<tr>
<th>n', n (%)</th>
<th>112 (37.33%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>104 (34.66%)</td>
<td></td>
</tr>
<tr>
<td>84 (28%)</td>
<td></td>
</tr>
</tbody>
</table>

Total number of drugs prescribed: 638

Antimicrobials used:

- No. of prescriptions with amoxicillin alone: 142 (47.33%)
- No. of prescriptions with amoxicillin and clavulanic acid: 52 (17.33%)
- No. of prescriptions with cefixime: 43 (14.33%)
- No. of prescriptions with cefuroxime: 40 (13.33%)
- No. of prescriptions with azithromycin, levofloxacin, and other antimicrobials: 23 (7.66%)

Quality indicators of drug use:

- Average number of drugs per prescription: 2.13
- Percentage of drugs prescribed by generic name: Nil

Concomitant medications:

- NSAIDs: 188 (62.66%)
- Antihistaminics: 142 (47.33%)

Table 2: Prescriptions [Number (%)] with various antimicrobials

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Prescriptions n', n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amoxicillin alone</td>
<td>142 (47.33%)</td>
</tr>
<tr>
<td>2. Amoxicillin + clavulanic acid</td>
<td>52 (17.33%)</td>
</tr>
<tr>
<td>3. Cefixime</td>
<td>43 (14.33%)</td>
</tr>
<tr>
<td>4. Cefuroxime</td>
<td>40 (13.33%)</td>
</tr>
<tr>
<td>5. Azithromycin</td>
<td>08 (2.66%)</td>
</tr>
<tr>
<td>6. Levofloxacin</td>
<td>06 (2.00%)</td>
</tr>
<tr>
<td>7. Erythromycin</td>
<td>051 (1.66%)</td>
</tr>
<tr>
<td>8. Tetracycline</td>
<td>04 (1.33%)</td>
</tr>
</tbody>
</table>

Table 3: Frequency of different drugs used in various URTI

<table>
<thead>
<tr>
<th>Drugs</th>
<th>ASOM</th>
<th>CSOM</th>
<th>Pharyngitis</th>
<th>Tonsillitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>20</td>
<td>10</td>
<td>72</td>
<td>40</td>
</tr>
<tr>
<td>Amox+Clav</td>
<td>05</td>
<td>05</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Cefixime</td>
<td>10</td>
<td>20</td>
<td>08</td>
<td>05</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>14</td>
<td>12</td>
<td>07</td>
<td>07</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>00</td>
<td>00</td>
<td>04</td>
<td>04</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>02</td>
<td>00</td>
<td>00</td>
<td>04</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>00</td>
<td>00</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>02</td>
<td>00</td>
<td>00</td>
<td>02</td>
</tr>
</tbody>
</table>

Table 4: Age wise frequency distribution of drugs constituting DU 90%

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Amoxicillin</th>
<th>Amox+Clav</th>
<th>Cefixime</th>
<th>Cefuroxime</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤15 years</td>
<td>82</td>
<td>09</td>
<td>18</td>
<td>12</td>
<td>121</td>
</tr>
<tr>
<td>16-60 years</td>
<td>45</td>
<td>28</td>
<td>15</td>
<td>23</td>
<td>111</td>
</tr>
<tr>
<td>≥ 60 years</td>
<td>25</td>
<td>15</td>
<td>10</td>
<td>05</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>142</td>
<td>52</td>
<td>43</td>
<td>40</td>
<td>287</td>
</tr>
</tbody>
</table>

Fig. 1: Antibiotics in DU-90% Segment

DU 90%

- Amoxicillin (47.33%)
- Amox+Clav (17.33%)
- Cefixime (14.33%)
- Cefuroxime (13.33%)
- Others (7.66%)

n = Total number of URTI cases treated, n (%) = Number (percentage)

clav — Clavulanic acid

ASOM: Acute suppurative otitis media
CSOM: Chronic suppurative otitis media
Amox+Clav: Amoxicillin + clavulanic acid
DISCUSSION

The DU90% index was introduced as a simple, inexpensive and flexible method for assessing the quality of drug prescriptions. It identifies the drugs accounting for 90% of the volume of prescribed drugs. The remaining 10% may contain specific drugs used for rare conditions in patients with a history of drug intolerance or adverse effects, complex co-morbid conditions and/or therapy prescribed by others.\[10\]

Upper respiratory tract infections are among the leading cause of acute morbidity and most frequent cause of health service access worldwide.\[11\] A study by Kameel M et al in the year of 2005 showed that amoxicillin (70.3%) was the most frequent antibiotic prescribed. Erythromycin (10.4%), amoxicillin+clavulanic acid (9.1%) and cefixime (8.0%) were the other antibiotics used.\[11\]

In our study, amoxicillin was prescribed in 47.33% of the prescriptions followed by amoxicillin+clavulanic acid in 17.33%, cefixime in 14.33% and cefuroxime in 13.33% (figure 1). Symptomatic treatments along with antimicrobials were given for fever, headache, running nose which is in accordance with the above study.

Despite the paucity of supporting evidences, the use of antibiotics in the management of URTI remains a persistent and worrying trend worldwide.\[12\] In the absence of use of culture and sensitivity of the secretions and throat swab, indispensable usage of antibiotics had led to increase in drug resistance organisms. Prescribing an antibiotic for URTIs is a common practice in the medical profession and any upper respiratory tract complaint result in an antibiotic being prescribed in 65% of the consultations, particularly for pharyngitis.\[13\] We found that at our tertiary hospital amoxicillin was the commonly used drug in URTI in all age groups (table 4).

Reasons for this trend could be as follows:
1. Organisms susceptible for amoxicillin in this area,
2. Oral bioavailability for amoxicillin is good,
3. Food interaction is minimal, 4. Cheaper and 5. Patient compliance is good.

In our drug utilization study, drugs were prescribed using brand names and not generic names. The main difference between these two is the cost. The generic drug is cheaper than branded drug. Hence to increase patients’ accessibility, generic drugs should be prescribed.

This study had some limitations. The results of this study might have been affected by the following factors: 1. Short data collection period (3 months), 2. Small sample size, 3. Seasonal variation which can affect the severity of URTI’s. 4. Lack of information about definite bacterial etiology and also prevalent organisms. Furthermore this study did not explore the adverse effects of drugs prescribed.

CONCLUSION

Present study showed that among the various antimicrobials used, only four antimicrobials figured in DU-90% segment which were amoxicillin, combination of amoxicillin and clavulanic acid and cephalosporins like cefixime and cefuroxime. Though azithromycin and levofloxacin were also commonly used in upper respiratory tract infections, in this study, they did not come under DU-90% segment.

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Not reported.

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