Drug Utilization Study of Respiratory Tract Infection

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In the present study, we have recorded the percentage of prescribing prevalence for different respiratory drugs and antibiotics and DDDs/1000inhabitants/day for different antibiotics to recognize the drug utilization trends in respiratory tract infections. In the present study, among the upper respiratory infection cases, 89.60% of the patients received antibiotics and culture was done in only 4.62% of patients. Among the lower respiratory infection cases all the patients were prescribed antibiotic therapy, culture was done in 39.58% of patients, and 55.26% was sterile. Pneumonia was found more in the age group of 41 to 70 whereas Nonspecific URTI and Sinusitis in the age group of 17 to 30. The sex distribution of the patients showed that the female constituted of 59.38% of the patients and male constituted of 40.56% of the patients. The upper respiratory tract infection constituted of 69.47% of patients and lower respiratory tract infection constituted of 31.16% of patients.

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INTRODUCTION

Background
Infection of the respiratory system is a severe human illness. A significant concern is also acute respiratory illness in India, responsible for 14.3% infancy deaths and 15.9% deaths of infants 1-5 years old of India (Kotwani and Holloway, 2014; Naik et al., 2014). The most severe acute condition involving humans is respiratory tract infection. This is classified into upper and lower infections of the respiratory tract (URTIs) (Mahajan et al., 2014).

Sinusitis, tonsillitis, laryngitis, otitis media, other types of influenza, as well as the common cold, are among the illnesses of the upper respiratory tract (Shaﬁnaz et al., 2019; Neumark et al., 2010; Cars et al., 2017).

URTI indications may include coughing, runny nose, throat irritation, nasal inflammation, headaches, low-grade fever, respiratory and sneezing stresses. Besides, infections of the lower respiratory tract are more severe than infections of the URTIs (Shin et al., 2015). Communicable diseases are major death causes for LRTIs. Bronchitis, as well as pneumonia, are the two most frequent LRTIs, pneumonia is the fourth most common death factor (Matera et al., 2018).

Drug usage by ambulatory patients in several countries is regularly tracked, but hospitalized trials are uncommon and incomplete (Lakic et al., 2014). Findings of the utilization of drug for the respiratory tract infections are small (Iftikhar et al., 2019). The goal of this work is to discuss drug use patterns for both the URTIs and LRTIs in the respiratory tract. Such research is not unique to a condition but represents global patterns and demonstrates changes in
the usage of medication groups and particular medications in acute respiratory infections.

**Research Objectives**

1. To study the drug utilization pattern in respiratory tract infection.
2. To quantify the drug utilization in respiratory tract infection.
3. To obtain necessary demographic information on respiratory tract infection patients admitted to the medicine ward during the study period.
4. To observe the respiratory tract infection most frequently treated.
5. To observe the associated illnesses, present with respiratory tract infection.
6. To calculate the average hospital stay.
7. To observe the outcome of each patient of respiratory tract infection at the time of discharge.
8. To quantify drug utilization in respiratory tract infection in terms of defined daily doses (DDD).

**MATERIALS AND METHODS**

**Data Collection**

The present study included patients of respiratory tract infection who were admitted to the medicine ward of the hospital. Data have been obtained from the medical record Office; for this necessary permission was obtained from the medical director of Krishna Hospital. The statistician was consulted, and statistical applications in the study were discussed.

The analysis of case records of patients admitted was carried out. Total of 257 case records of the patients was analyzed during the study period. Diagnosis, along with the drugs prescribed, was recorded for each patient of respiratory tract infection. Also, the demographic status of the patient was noted.

**Data Analysis**

The collected data were simplified, and master templates for data interpretation were planned. The data were subjected to Microsoft excellent detailed statistical review. The general information generated was thoroughly analyzed to study.

1. Distribution of respiratory infections (age and sex-wise).
2. The most common respiratory infections treated.
3. Presence of associated illnesses.
4. The outcome of each patient of respiratory infections.
5. The average duration of stay in the hospital.
6. Drug utilization is presented as percentages.
7. Utilization of drugs in terms of DDD/1000 inhabitants/day.

**DDD Evaluations**

DDD was calculated as per guidelines for ATC classification and DDD assignment as given by WHO collaborating centre for drug statistics methodology, Oslo, Norway Figure 1.

**OBSERVATIONS AND RESULTS**

All the case records had the complete documentation of information, including patient's demographic characteristics, diagnosis, disease type, drug names, dose route and frequency of intake.

![Figure 1: Formula for calculating DDD analysis](image)

![Figure 2: Distribution of cases according to illness](image)
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Figure 3: Age and sex distribution of the illness

Figure 4: Associated illness with RTI

Table 1: Average hospital stay and the average number of drugs used

| Illness     | Duration | Drugs |
|-------------|----------|-------|
| LRTI        | 5.46     | 5.48  |
| Pneumonia   | 6.52     | 6.01  |
| URTI        | 3.28     | 3.57  |
| Sinusitis   | 4.26     | 3.74  |
| Pharyngitis | 3.68     | 3.68  |
| CSOM        | 3.85     | 4.00  |

Table 2: Percentage distribution of oxygenation and nebulization

| RTI        | Oxygenation | Nebulization |
|------------|-------------|--------------|
| LRTI       | 13.33       | 40           |
| Pneumonia  | 43.13       | 64.70        |
| URTI       | 0           | 7.07         |
| Sinusitis  | 0           | 5.97         |
| Pharyngitis| 0           | 0            |
| CSOM       | 0           | 0            |

Table 3: Number and percentage of significant classes of drug prescribed

| Drug class                  | No of patients | Percentage |
|-----------------------------|----------------|------------|
| Antimicrobials              | 239            | 92.99      |
| Antihistamines              | 131            | 50.97      |
| Antipyretics                | 107            | 41.63      |
| Bronchodilators             | 98             | 38.17      |
| Expectorants                | 89             | 34.63      |
| Nasal decongestants         | 65             | 25.29      |
| Antitussives                | 27             | 10.50      |
| Leukotriene antagonist      | 23             | 8.94       |
| Steroids                    | 21             | 8.17       |
| PPI’s and H2 blockers       | 218            | 84.82      |

Table 4: Percentage distribution of IVF, multivitamin tablets and injection

| RTI    | LRTI | URTI |
|--------|------|------|
| IVF    | 62.5%| 45.66%|
| MVI    | 30.20%| 23.69%|
| MVT    | 39.58%| 42.77%|

Table 5: Comparison of PDD and DDD

| PDD > DDD | PDD < DDD | PDD = DDD |
|-----------|-----------|-----------|
| Amoxicillin (O) | Amoxicillin (P) | Moxifloxacin |
| Piperacillin | Cefotaxime | Levofloxacin |
| Cefepime    | Cefadroxil | Ofloxacin  |
| Cefuroxime  | Cefoperazone |
| Ceftriaxone | Cefixime   |
| Azithromycin| Cefpodoxime|
| Doxycycline |
| Metronidazole|

in the age group of 41 to 70, whereas Nonspecific URTI and Sinusitis in the age group of 17 to 30 Figure 3.

Hypertension (HTN) and Diabetes mellitus (DM) were the commonly associated illness in the study Figure 4.

Combination of drugs was considered as one drug in the above table Table 1. Duration of stay and the number of drugs prescribed was maximum for pneumonia and LRTI. Total six deaths were observed, and in all the cases, the reason for the death was mentioned as cardiopulmonary arrest Table 2.

Oxygenation and nebulization were more frequently used in LRTI and Pneumonia, indicating its sever-
ity. In the culture and sensitivity, 58.6% were sterile and in 23.91%, 13.04% and 4.34% Klebsiella, Coagulase positive staphylococci and streptococci were isolated respectively Table 3.

Ceftriaxone, Azithromycin and cefixime were the most prescribed antimicrobials, and among the beta-lactamase inhibitors tazobactam was preferred. Among the bronchodilators terbutaline, etophylline and theophylline were prescribed. Guaiaphenesin among the expectorants, cetirizine and triprolidine among the antihistamines and phenylephrine among the nasal decongestants were commonly prescribed in the study. Different other factors observed in the study are presented in Table 4.

The PDD can differ based on the diseases and practice of national therapies. E.g., PDDs that differ depending on the nature of the infection for anti-infective patients. DDDS are focused on relatively serious infections for most anti-infective cases. Far larger concentrations in medical services are also used and that it must be taken into consideration by using DDD as a testing device Table 5.

CONCLUSIONS

In the present study, among the upper respiratory infection cases, 89.60% of the patients received antibiotics and culture was done in only 4.62% of patients, and all the cultures were sterile. In none, the organisms were isolated, indicating a majority of them might be of viral in origin. Among the lower respiratory infection cases, all the patients were prescribed antibiotic therapy, culture was done in 39.58% of patients, and in the 55.26% was sterile. In 23.68%, 15.79% and 5.26% patients Klebsiella, Coagulase positive staphylococci and streptococci were isolated respectively. Nonspecific URTI was the standard diagnosis. The average number of drugs used for this condition was low, but it must be allowed to be recommended by generic names. The intake of necessary drugs was small. Even though the number of cases of lower respiratory infections was low, but the number of drugs used, hospital stay was more, and all the mortality in the study were noticed in RTI infections.

Conflict of interest

The authors declare that they have no conflict of interest for this study

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