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EVALUATION OF DRUG UTILIZATION PATTERN OF ANTIBIOTICS USED IN UPPER AND LOWER RESPIRATOERY TRACT INFECTION IN A TERTIARY CARE HOSPITAL

Sreelakshmi PS*[1], Puranik DS[1],Wasiullah M[2], Sivakumar P[1], Prashant Chandra[1]

[1]Nehru College of Pharmacy Palakkad, Kerala, India.
[1]Parul University Vadodara, Gujarat, India.

ABSTRACT

The study aims at evaluating the drug utilization pattern of antibiotics in patients with upper respiratory tract infection in a tertiary care hospital. Objectives: Present study is based on drug utilization pattern of different antibiotics used in upper respiratory tract infection comprises generating data on prescribing pattern in patient and compare PDD with DDD established by World Health Organization. Study covers study of antibiotics, average number of drugs per prescription, estimation the usage pattern and consumption of different antibiotics, find out the most frequently prescribed antibiotic for the particular type of respiratory tract infection, frequently used treatment combination along with the antibiotics and study about the various type of respiratory tract infections. Recording patient demographic parameters. analyses of prescribing patterns of the antibiotic at departmental level using icd classification of disease, atc classification of drugs and ddd as research tools, utilization of antibiotics will be measured in terms of defined daily dose/ 100 bed days (ddd per 100 bed days), descriptive statistical analysis is carried out. Study was conducted atpk das institute of medical sciences, aniyamkulam, after obtaining the permission of ethical committee, study design (prospective observational study) duration of study (six month) sources of data (physicians prescribing records, patient's medication records, discharges summaries parameters for evaluation (demographics of the patient, past history of respiratory tract infection, clinical investigations parameters, diagnostic report, medication details, study population patients of all age groups with respiratory tract infection admitted or provided with ambulatory care by the dept. of pulmonary medicine of the hospital. study based on inclusion and exclusion criteria. Result and Conclusion: Respiratory tract infection in general can cause restricted activities like loss of time from work and school etc. Along with this inappropriate and excessive treatment of these infections will contribute to the resistance of susceptible pathogens and this can lead to the re-hospitalization of patients. The reason for admission to hospitals might be the recurrent infection as the chief complaints but almost patients were treated with the same or alternative antibiotics without any culture or sensitivity tests. In this study most of the cases were not assessed by sputum culture, antibiotic sensitivity test and lung function test. This type of treatment was mainly seen in patients with non specific URTI. DU studies have the potential to make objective evaluation and analysis of health professionals work and provide a feedback to stimulate thinking about the practice and looking for ways to improve the performance. In this study most of the drugs were prescribed by brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control. Generic drugs are more economic than branded one and this can be easily affordable by the patients. More over that many drugs are selected from NLEM. From the results it was found that most commonly used antibiotic was Azithromycin and Ceftriaxone for the treatment of both upper and lower respiratory tract infection.

Keywords: Evaluation, Azithromycin And Ceftriaxone, Demographics, Defined Daily Dose, Drug Utilization Pattern, Antibiotics.

Corresponding Author:- **- Prashant Chandra** Email:- Prashantpharmacy108@gmail.com

INTRODUCTION

Respiratory tract infection (RTI) refers to a variety of infectious diseases involving the respiratory tract. They are broadly categorized as upper and lower respiratory tract infection on the bases of the anatomical regions of the lungs that is affected. Upper respiratory tract infection (URTI) is a nonspecific term used to describe acute infections involving the nose, paranasal sinuses, larynx, trachea, and bronchi. Infections of the upperrespiratorytractinclude tonsillitis, pharyngitis, laryng itis, sinusitis, otitis media, certain types of influenza and common cold [1]. Two most common lower respiratory tract infections (LRTI) are bronchitis and pneumonia. These infections are generally more serious and are the leading cause of death by lung infection.(LRTI) are frequently associated with significant morbidity and mortality [2].

Almost 80%of patients with respiratory track infections are treated with antibiotics. Multiple studies have provided evidence that there is no roll for antibiotics in the management of upper respiratory tract infections like common cold and mild URTI [1]. Use of antibiotic in LRTI has become controversial due to their indiscriminate use, resulting in the development of antibiotic resistance. Serious concerns are being raised regarding misuse of antibiotics at community level due to self-medication and lack of information on its rational use [3].

Although use of antibiotics has brought revolutionary changes in the effective management of respiratory tract infection, there usage is also on the rise due to increase in the prevalence of respiratory disease. Inappropriate use is however increasing the development of antimicrobial resistance leading to change in the utilization pattern. Availability of more effective drugs, improved educational status of patients, greater expectations from health care and financial coverage of health care provided by State and private health insurance also bringing about a change in drug utilization pattern. Delineation of the drugs utilization patterns with respect to its usage and impact on medical, social and economic factors during the entire life cycle of a drug is therefore the first step in achieving optimal utilization within the framework of generally accepted criteria [4-7].

DRUG UTILISATION STUDY

High demand for readily available pre-formulated drugs resulted in manufacture and sale of drugs turning out into an economic activity. Entry of large number of players into the business of manufacture and sale of drugs brought in the practice of patenting drugs and formulations and selling them under brand names as one of the sales strategy in an ever competitive market. Commercialization of drug manufacture and competitive sales strategies also saw an increase in the number of claims regarding improved efficacy of drug without providing substantial evidence and also claims of improved efficacy of branded combinations over conventional single ingredient products. These developments together with observation of the emergence of adverse reactions, high variability in drug cost between branded and generic drugs, the economic impact on patients and health consequences, necessitated regulatory control with respect to manufacture, sale, testing, pricing and usage of drugs [8].

Quantum of different drugs that are actually consumed, the purposes behind such consumption, patterns in the writing of prescription at the clinician and at the hospital, needed to be studied to bring in comprehensive regulations to regulate the consumption and also assess the economic burden of the drug during its life cycle. Statistical study of existing data with respect to these issues was one of the primary requirements in the framing of policies and bringing the required regulations. Such Information though available with the drug manufacturing industries was not reliable and easily forthcoming because of trade secrecy and the industries mistrust of regulatory controllers [9-15].

Massive amount of records kept under the national insurance schemes though more reliable and available easily, used statistical tools and formats that met the requirements of financing, administration and reimbursements that were carried out by these agencies. These tools were however not useful for analysing consumption and usage pattern of drugs. Arrival of electronic data processing made available a mass of records in digital formats that were maintained at the level of physician's office, retail pharmacy and inpatient records at hospitals. Their advent allowed quick and easy conversion of data that were available with manufacturers, distributors, retailers, prescribers and health care providers into newly designed formats that were developed to carry out studies with respect to epidemiology, drug prescribing habits of physicians, safety and efficacy of drugs, disease prevalence and drug consumption [16].

In order to comprehensively cover different studies related to drug use under a single universal study, World Health Organization (WHO) in 1977 defined studies on drug utilization as "An evaluation of marketing, distribution, prescription and use of drugs in the society and also the medical, social, and economic consequences of its use. "as one of its efforts to ensure universal access to essential drugs and to stimulate rational use of drugs particularly in developing countries. Comprehensive and universal coverage of drug utilization by Meta analysis was not possible earlier as there was a wide difference in the use of measuring units, dose, nomenclature of the disease, purpose behind the use of drugs, use in combination with one or more drug and classification of

the drugs used. It brought in various, nomenclatures, classifications and statistical tools by means of which the data collected from different regions of the world could be accommodated into a universal format and analyzed. Studies carried out with these new formats also provide very important information including indirect data on morbidity, pharmaceutical component of the treatment cost of an illness, therapeutic compliance, the incidence of adverse drug reaction, and the effectiveness of drug consumption. They also provided crude estimates of disease prevalence [17-24].

Drug utilization reviews (DUR) brought into use are prospective (evaluation of patient therapy before medication is dispensed), Concurrent (ongoing monitoring of drug therapy during the course of therapy.) or Retrospective (review of drug therapy after the patient has received the medication) in nature. Qualitative or quantitative studies may be initiated depending on the purpose of the study. Qualitative drug evaluations are multidisciplinary operations which collect, organize, analyze and report information on actual medications use. They usually examine the use of specific medications or specific conditions. Quantitative drug evaluations involve collection, organization and display of estimate or measurement of medication use. These are generally used for preparing medication budget or making purchase decisions [25-30].

Studies on drug utilization often provide insights into the following aspects of drug use and drug prescribing.

- Pattern of use:Thatcovers the extent and profiles of drug's use and the trends in its use with respect to change in costs over time.
- Quality of use**:** That can be determined using audits to compare actual use to national prescription guidelines or local drug formularies. Indices of quality of drug use may include the choice of drug (compliance with recommended assortment), drug cost (compliance with budgetary recommendations), drug dosage (awareness of inter-individual variations in dose requirements and age-dependence), awareness of drug interactions and adverse drug reactions, and the proportion of patients who are aware of or unaware of the costs and benefits of the treatment.

• Determinants of use:That provides user characteristics (e.g. socio-demographic parameters and attitudes towards drugs), prescriber characteristics (e.g. specialty, education and factors influencing therapeutic decisions) and drug characteristics (e.g. therapeutic properties and affordability).

• Outcomes of use: Health outcomes (i.e. the benefits and adverse effects) and economic consequences.

- It is of use in arriving at an estimate of the numbers of patients exposed to specified drugs within a given time period. Estimates may be with respect to all drug users, regardless of when they started to use the drug (prevalence), or focused on patients who started to use the drug within the selected period (incidence).

The procedures and statistical tools developed to carry out Drug utilization studies can also be used to

• Estimate of use a drug at a certain moment and/or in a certain area (e.g. in a country,
region, community or hospital), which are relevant and form part of a continuous evaluation system, i.e. when the patterns are followed over time and trends in drug use can be discerned.

• Determine the extent of drug usage (appropriate, under or over use) on the basis of epidemiological data on a disease.

• Provide the pattern or profile of drug use and the extent to which alternative drugs are being used to treat particular conditions.

• For comparison of observed patterns of drug use for the treatment of a certain disease with current recommendations or guidelines.

• Study patterns of drug utilization where it is utilized as a quality indicator (Drug Utilization 90% (DU90%)

The utility of the observations and conclusions that can be arrived from studies on drug utilization are many fold:

- Discussion on rational drug use, suggestions to improve prescribing habits is not rational without evidence on how drugs are being prescribed and used. Information on the past performance of prescribers is the linchpin of any auditing system.
- DUR. results may generate hypotheses that set the agenda for further investigations and avoid prolonged irrational use of drugs.
- Drug utilization patterns and costs between different regions or at different times may be compared. Hypotheses can be generated to form the basis for investigations of the reasons for, and health implications of the differences found.
- Observation of Geographical differences and changes in drug use over time with medical, social and economic implications, for individual patient and for society.
- The observed patterns of drug use can be compared with the current recommendations and guidelines for the treatment of a certain disease. Hypotheses can then be generated using the results to determine whether discrepancies represent less than optimal practice, whether pedagogic interventions (education) are required or whether the guidelines should be reviewed in the light of actual practice [31-38].

Use of a single drug entity to treat more than one type o disease; dosage changes related to age and ethnic differences; availability of the drug as a single entity or in combination with another drug; use of different measurement units; severely restricted reliable comparative studies of drug utilization between different countries and regions. WHO Drug Utilization Research Group developed three important concepts in the form of

tools to be used in DUR, that are named as *Anatomical Therapeutically and Chemical Classification* (ATC) of drugs; Anatomical Classification of Disease (ACD) and *Defined Daily Dose (DDD)* so as to improve the situation and make drug utilization studies more reliable and relevant [39].

Defined Daily Dose (DDD)

DDD. for each drug and route of administration is defined by WHO Collaborating Center for Drug Statistics the value is an assumed average maintenance adult dose per day for its main indication. DDD is essentially an international statistical unit for use in international or regional comparisons. Drug consumption figures should preferably be presented as numbers of DDDs/1000 inhabitants/day or, when in-hospital as DDDs per 100 bed days. Sales or prescription data are to be presented as DDD/1000 inhabitants/day [40-43].

The ATC Classification System

The system classifies drugs making use of five sub levels. The first level is assigned on the bases of the organ or system on which it is used. Drugs are divided into fourteen main groups at this level. This level allows comparative drug utilization studies to be carried out between groups of drugs acting on a particular anatomical system. The second level is assigned on the broad therapeutic property/broad pharmacological action of the drug. This level of classification allows for comparison studies in drug utilization to be carried out between different groups drugs that are used for the same broad therapeutic indication but with a differing therapeutic approach. The level also assists comparative studies of a single drug that is used for more than one indication by making provision for the classification of the same drug into more than one class. The same drug is classified as separate entity with respect to each indication and even assigned different identification code. The 3rd and 4th levels are assigned on the bases on chemical group to which a drug belongs, specific pharmacological action at cellular or tissue levels and also specific therapeutic property. These sublevels provide scope for carrying out comparative drug utilization studies between different chemical classes of drugs having the same pharmacological action. Classification of drugs at the 5th level is on the bases of its individual chemical structure and provides scope to carry out comparative studies with respect to the drug's efficacy, economy and safety. The 2nd, 3rd and 4th levels are also often used to identify pharmacological subgroups when that is considered more appropriate than therapeutic or chemical subgroups [44-47].

DUR also brought in a unique coding system to identify individual drugs so as to maintain uniformity in its nomenclature and identity in comparative drug utilization studies. Each drug is assigned a single alphabet written in upper case that is indicative of the group that it is classified at the first level under the ATC system. This is followed by a two numerical that indicates the main therapeutic class to which it belongs. It is followed by two more alphabets of which the first indicates the pharmacological sub class and the second, the chemical group to which the drug belongs. This is followed by two numerical that are assigned on the bases of difference in chemical structure. The coding assigned for Metformin in ATC. System of classification is A10BA02. Where A represents Alimentary tract and metabolism, A10 Drugs used in diabetes, A10B Blood glucose lowering drugs, excluding insulinA10BA Biguanides, A10BA02 metformin [48].

International non-proprietary names (INN) are used in the classification to identify a drugs, or USAN (United States Adopted Name) or BAN (British Approved Name) names when it is not available. The rule avoids study duplications occurring due to multiple nomenclature and indirect promotion of particular brand. WHO's list of drug terms (Pharmacological action and therapeutic use of drugs - List of Terms) is used when naming the different ATC levels to avoid regional variability in terminology that can complicate comparative studies.

A single ATC code is provided to a drug even though it is available in multiple dosage forms or strength unless the dosage form or strength is meant for a different therapeutic use. Such a restriction avoids complication in quantitative drug utilization studies especially in hospital setting where more than a single dosage form is used in the course of a treatment for a particular indication.

Pharmaceutical forms of a drug for topical and systemic use are also given separate ATC codes as the two forms are used on different anatomical regions even if the therapeutic indication is the same. Such a classification allows comparative study of drug that has a single indication but targeted for use at different areas.

A single medicinal product in use for two or more equally important indications but differing in its therapeutically usage from one country to another are assigned only one code in spite of multiple possibilities. The code for such drug is decided on the bases of the main indication available in literature. Cross-references will be given in the guidelines to indicate the various uses of such drugs. Such an arrangement avoids international comparative studies, which if performed does not yield any useful results.

Each stereo isomeric forms of a drug will have separate ATC codes. Such coding allows for recognizing the difference in biological activity between enantiomers of the drug and their comparative evaluation in drug utilization studies.

Prodrugs are usually assigned separate ATC codes if the dosages used are different and/or the non-proprietary name of the Prodrugs and the active drugs are different. The arrangement allows distinction of different

Prodrugs that are available for a single metabolically active form.

Products containing two or more active ingredients are regarded as combination products.

Combination products are classified according to three main principles.

a) Combination products containing two or more active ingredients belonging to the same 4th level are normally classified using the 5th level codes 20 or 30.

b) Combination products containing two or more active ingredients not belonging to the same 4th level are classified using the 50-series.

c) Combination products containing psycholeptic drugs, which are not classified under N05 - Psycholepticsor N06 - Psychoanaleptics, are classified at separate 5th levels using the 70-series. Such a distinction allows for comparative studies of combination with respective to efficacy, safety and economic cost.

d) Combination products having two or more drugs differing in their pharmacological indication are assigned a single primary grouping among the fourteen that are available. The assignment is done taking into consideration the organ or system on which it is used. An analgesic and a tranquillizer, and used primarily to ease pain, should be classified as an analgesic. Likewise, combinations of analgesics and antispasmodics will be classified in A03 Drugs for functional gastrointestinal disorders if the antispasmodic effect of the product is considered most important. Use of the ATC/DDD system thus allows standardization of drug groupings and stable drug utilization metric to enable comparisons of drug use between countries, regions, and other health care settings, and to examine trends in drug use over time and in different settings [49].

Antibiotics are the most commonly used therapeutic agents accounting for majority of ambulatory care prescription. They represent approximately 30% of hospital drug expenditure and are prescribed for 20-80% of the patients and surveys showed that 22-65% of antibiotic prescriptions are either incorrect or inappropriate. It is therefore inevitable that drug utilization studies are carried at ambulatory and inpatient setting to evaluate their usage and compare them with national or international values. The current study is carried out in this direction.

AIM OF THE STUDY

The study aims at evaluating the drug utilization pattern of antibiotics in patients with upper respiratory tract infection in a tertiary care hospital

To study the drug utilization pattern of different antibiotics used in upper respiratory tract infection.

- ❖ To generate data on drug utilization in patient and compare PDD with DDD established by World Health Organization
- ❖ To study prescribing pattern of antibiotics.
- ❖ To find out the average number of drugs per prescription.
- ❖ To estimate the usage pattern and consumption of different antibiotics.
- ❖ To find out the most frequently prescribed antibiotic for the particular type of respiratory tract infection.
- ❖ To study about the frequently used treatment combination along with the antibiotics.
- ❖ To study about the various type of respiratory tract infections [50].

MATERIALS AND METHOD

STUDY SITE

Study was conducted atPK DAS Institute of Medical Sciences, Vaniyamkulam, after obtaining the permission of ethical committee.

STUDY DESIGN

Prospective observational study, Six month from November 2016 to May 2017.

SOURCES OF DATA

- ❖ Physicians prescribing records.
- ❖ Patient's medication records.
- ❖ Discharges summaries

PARAMETERS FOR EVALUATION

- ❖ Demographics of the patient.
- ❖ Past history of respiratory tract infection.
- ❖ Clinical investigations parameters.
- ❖ Diagnostic reports
- ❖ Medication details

STUDY POPULATION

Patients of all age groups with respiratory tract infection admitted or provided with ambulatory care by the Dept. of Pulmonary Medicine of the Hospital.

INCLUSIONS

- ❖ In patients and out patients irrespective of gender diagnosed with respiratory tract infection and provided antibiotic therapy..
- ❖ Patients of any age category

EXCLUSIONS:

- ❖ Patients with respiratory tract infection having co morbidities like TB, HIV and other infection
- ❖ Patients with respiratory tract infection not on any antibiotic therapy.
- ❖ Pregnant and nursing women.

OBSERVATIONS

Table1. Pattern of Care needed by the patient

Sl. No	Type	Total no. of Patients (N=200)	Percentage (%)
1.	OPD	81	40.5
2.	IPD	119	59.5

Table 2. Gender wise Distribution of Patients in need of Antibiotic Therapy

Sl. No.	Gender	Total No. of Patients (N=200)	Percentage (%)
1.	Male	107	53.5%
2.	Female	93	46.5%

Table 3. Age wise Distribution of Patients in need of Antibiotic therapy

Sl. no	Age Group (Years)	Total no. of Patients (N=200)	Percentage (%)
1.	Children (0-12)	51	25.5%
2.	Adolescent (13-19)	14	7.0%
3.	Adult (20-59)	49	24.5%
4.	Geriatrics (above 60 Yr)	86	43.0%

Table 4. Frequency and Types of Respiratory Tract Infection

Sl.No	Infection	Total No. of Patients (N=200)	Percentage (%)
URTI Total No.of Patients(N=123) (61.5%)	Non-specific (Common cold, Rhinitis)	56	45.52%
	Otitis media	17	13.82%
	Tonsilitis	22	17.89%
	Sinusitis	19	15.45%
	Pharyngitis	7	5.69%
	Laryngitis	2	1.62%
LRTI Totalno.of Patients (N=77) (38.5%)	Bronchitis	16	20.77%
	Bronchiectasis	4	5.19%
	COPD	19	24.67%
	Asthma	27	33.06%
	Pneumonia	11	14.28%

Table 5. Usage Pattern of Antibiotics in The Treatment of Respiratory Tract Infection

Sl. No.	Class	Total no. of Drugs (N=396)	Percentage (%)
1	Cephalosporins	197	49.74%
2	Macrolides	21	5.30%
3	Aminoglycosides	45	11.36%
4	Penicillins	114	28.79%
5	Quinolones	19	4.80%

Table6.Usage Of Antibiotic As Monotherapeutic Agent

Sl. No	Antibiotic	Total no.of drug (N=229)	Percentage (%)
1	Azithromycin	69	30.13%
2	Ampicillin	14	6.10%
3	Amoxicillin	26	11.35%
4	Cefixime	22	9.60%
5	Ceftriaxone	40	17.46%
6	Amikacin	11	4.80%
7	Ciprofloxacin	16	6.90%
8	Levofloxacin	13	5.69%
9	Cefpodoxime	9	3.90%

Table 7.Usage of Antibiotic in Combination with other Antibiotics

Sl. No	Combinations	Total no. of drug(N=167)	Percentage (%)
1	Amoxicillin+Clavulanic Acid	118	70.65%
2	Ciprofloxacin+Ceftriaxone	31	18.56%
3	Cefpodoxime+Clavulanic Acid	18	10.77%

Table 8. Incidences of Prescription Generated for Drugs That Are Branded, Covered Under NLEM and By Generic Name

Sl. No	Parameter	Total no. of drugs (N=1477)	Percentage (%)
1	Drugs Prescribed by Generic Name	193	13.06%
2	Drugs prescribed by brand name	986	66.76%
3	Drugs prescribed from NLEM	298	20.17%

Table 9.No. of Antibiotics Used in each Patients

SlNo.	Category	No. of Prescription (N=200)	Percentage %
1.	Single antibiotic	41	20.5%
2.	Two antibiotics	90	45%
3.	Three antibiotics	62	31%
4.	4 antibiotics	7	3.5%

Table 10. ATC CODE, DDD, PDD AND DDD/100 BED/ DAYS

Drug	ATC code	DDD(mg)	PDD(mg)	DDD/100 Bed/day
Amoxicillin	J01CR02	1000	1000	24.620
Ampicillin	J01CA01	2000	2050	6.154
Amikacin	J01GB06	1000	955.5	12.308
Azithromycin	J01FA10	300	329.7	41.02
Cefixime	J01DD08	400	363.2	37.708.
Ceftriaxone	J01DD04	2000	2226.72	06.154
Cefpodoxime	J01DD13	400	400	37.708
Ciprofloxacin	J01MA02	1000	933.3	12. 308
Levofloxacin	J01MA12	500	500	24.016

Table 11. Comparison of PDD and DDD

PDD>DDD	PDD<DDD	PDD=DDD
Azithromycin	Amikacin	Amoxicillin
Ceftriaxone	Cefixime	Cefpodoxime
Ampicillin	Ciprofloxacin	Levofloxacin

Fig 1.

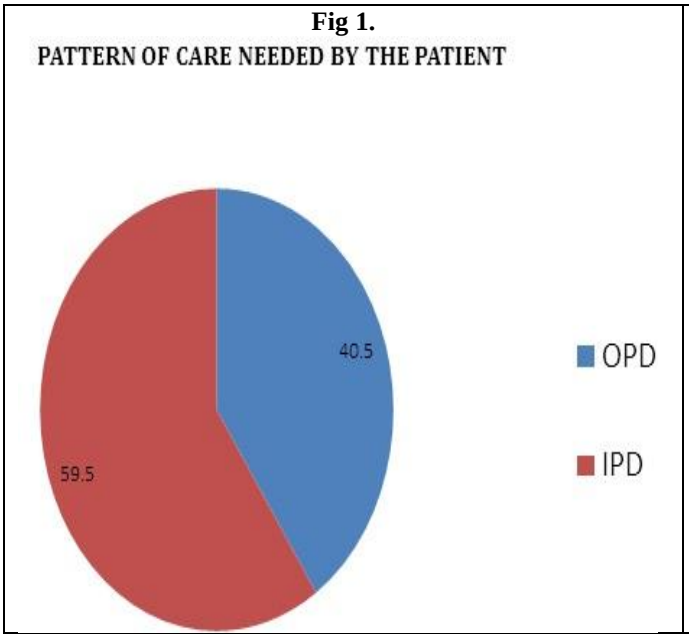


Fig 2.

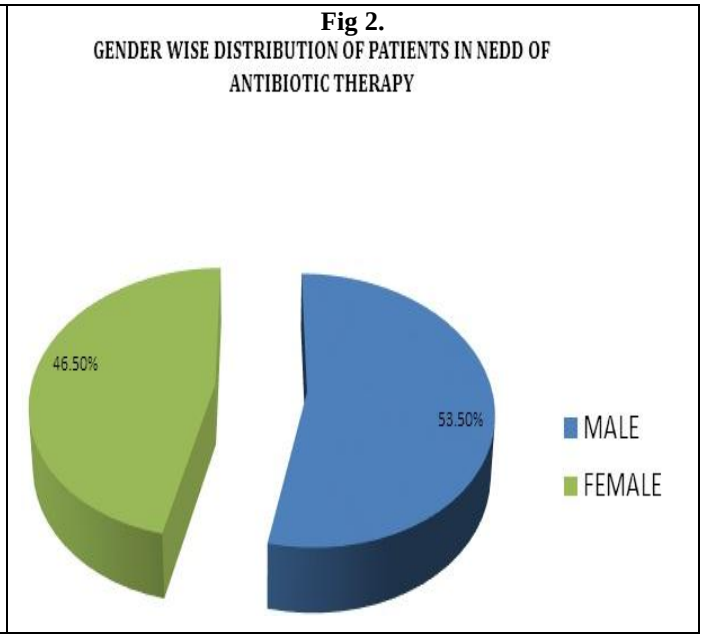


Fig 3.

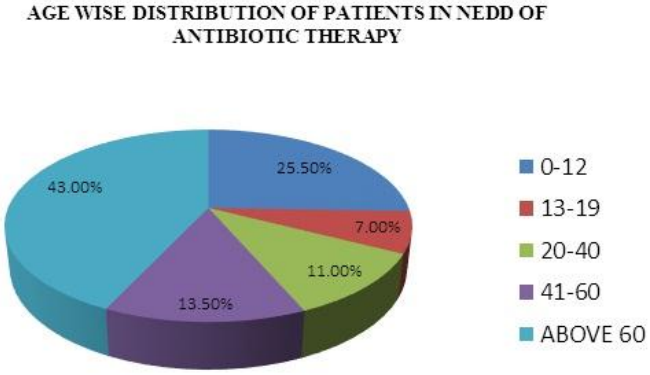


Fig 4. Frequency and types of respiratory tract infection

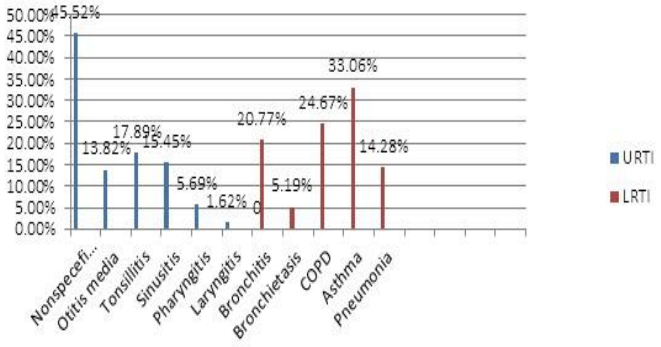


Fig 5. Usage pattern of antibiotics in the treatment of respiratory tract infection.

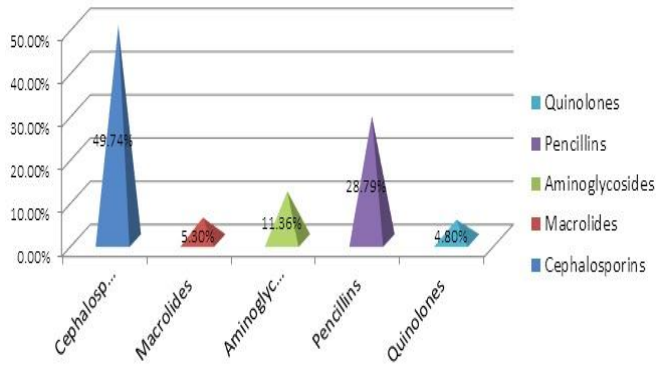


Fig 6. Usage of antibiotic as monotherapeutic agent.

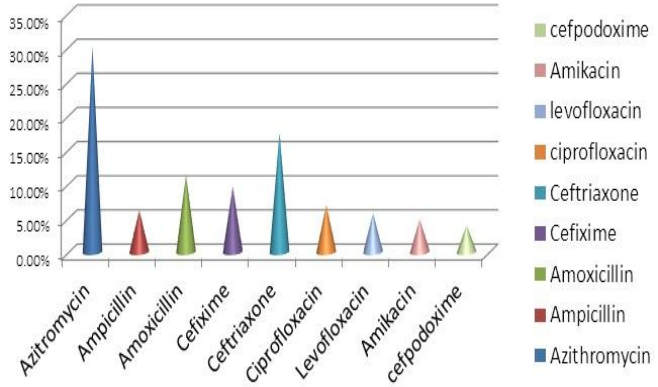


Fig 7.

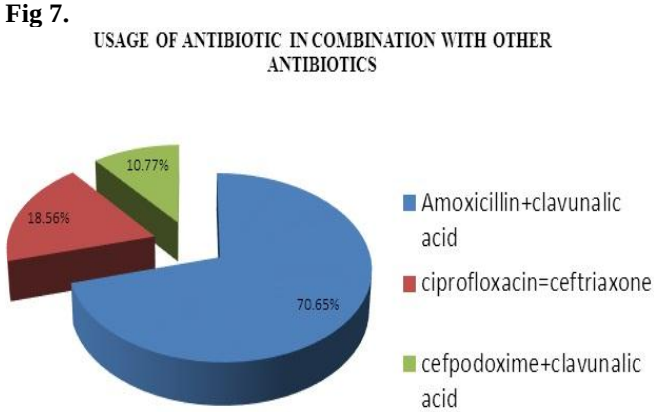


Figure 8.

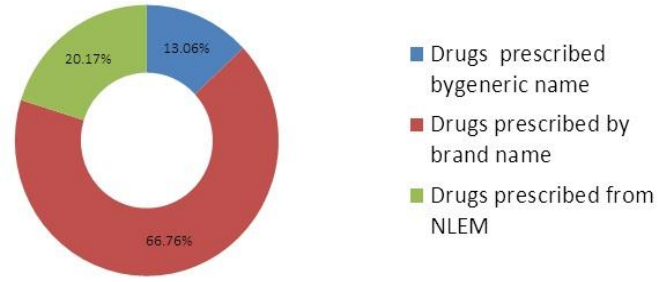
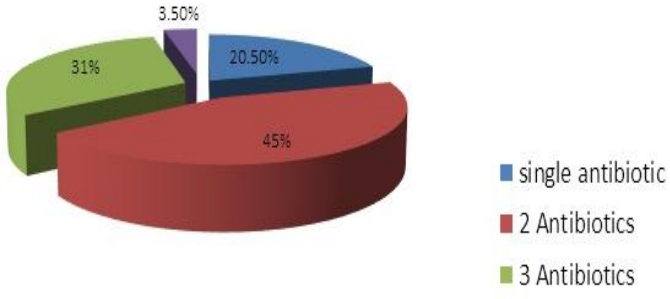


Fig 8.



RESULT AND DISCUSSION

Based on inclusion and exclusion criteria 200 patients with respiratory tract infection and in need of therapy with antibiotics were recruited for the study after obtaining a written informed consent to participate in the study. Recruitment was from ambulatory and inpatient care setting and was carried out over a time span of six months extending from November2016 to May 2017. Required data of all the participants were collected and recorded in a data collection form that was designed for the purpose. Demographic details, signs and symptoms, investigations carried out, diagnosis and use of drugs in therapeutic management were included.

Pattern of care needed by the patient: Of the two hundred patients included in the study only ambulatory care was sufficient for 81 where as 119 needed hospitalization. They correspondingly constitute 40.5% and 59.5% of the patients who were provided treatment with antibiotics. Table 1.

Gender wise distribution of patients in need of antibiotic therapy: In the present study it is observed that the number of patients who required intervention with antibiotics was higher among males 107(53.5%) as compared to females 93 (46.5%). However there was no correlation between gender and need for antibiotic therapy. Table 2.

Age wise distribution of patients in need of antibiotic therapy

Patients were grouped into 4 groups on the bases of age as Children (0-12 years), Adolescent (13- 19) years, Adults (20- 59 years), and Geriatric (above 60 Yr). Among these groups the incidence of need for treatment with antibiotics was found to be highest among geriatrics 43.1 %(86 patients) and the lowest among Adolosents 7.0% (14patients). The incidences were nearly equal among Children25.5% (51 patients) and Adults 24.5% (49patients) Table 3.

Frequency and types of respiratory tract infection: Thetypes of upper respiratory tract infections encountered inthe present study period were Non-specific infections (common cold and Rhinitis), Ottis Media, Tonsillitis, Sinusitis, Pharyngitis and Laryngitis. Among the 123 patients who were diagnosed with URTI,there were 56 incidences of Non-specific infection (45.52%), 17 incidences of Ottis Media (13.82%), 22 incidences of Tonsillitis (17.89%), 19 incidences of Sinusitis (15.45%), 7 incidences of Pharyngitis (5.69%) and 2 incidences of Laryngitis(1.62%).

The types of lower respiratory tract infections encountered in the present study period were Bronchitis, Bronchiectsis, Chronic obstructive pulmonary disease (COPD.) Asthma and Penumonia. Among 77 patents who were diagnosed with LRTI., there were 16 incidences of Bronchitis (20.77%), 4 incidences of Bronchiectsis (5.19%), 19 incidences of COPD (24.67%), 27 incidences of Asthma (33.06%) and 11 incidences of Pneumonia (14.28%). The results are summarized in Table 4.

Usage of antibiotics in the drug treatment of respiratory tract infection:

There were 396 incidences of antimicrobial usage in the 200 cases that were studied. Incidences of usage of different classes of antibiotics are summarized in Table 5. Of these 197 incidences were for Cephalosporins that constituted 49.74% of the total incidences, 114 incidences were for Pencillins (28.79%), 45 for Aminoglycosides (11.36%), 21 for Macrolids (5.30%) and 19 for Quinolones (4.80%)

The incidence of usage of Cephalosporins 197(49.74%) as monotherapeutic agent was the highest followed by pencillins , aminoglycosides, macrolides, and quinolones.

Antibiotics were used in the form of monotheraputic agents as well as in combination with other antibiotics. Among the 396 incidences of antimicrobials used 229 (57.82%) were in the form of monotherapeutic agent the details of which are summarized in Table 6. There were 69 incidences (30.14%) of Azithromycin use , 40(17.46%) incidences of ceftriaxone, 26(11.35%) incidences of amoxicillin, 22(9.6%) incidences of cefixime 14(6.1%) incidences of ampicillin, 14(6.9%) incidences of ciprofloxacin, 13(5.69%) incidences of levofloxacin, 11(4.8%) incidences of amikacin and 9 (3.9%)incidences of cefpodoxime as a monotherapeutic agent.

Incidences of usage of antibiotics in combination with another antibiotic was 167, among these there were 118 (70.65%) incidences of use of amoxicillin in combination with clavunalic acid, 31(18.56%) incidents of use of ciprofloxacilin in combination with ceftriaxone and 18(10.71%) incidents of use of cefpodoxime with clavunalic acid. The results are summarized in Table7.

Antibiotic therapy in the form of combination of amoxicillin with clavunalic acid appears to be favored over other combinational forms and also monotherapy.

Rational usage of drug favors prescribing drugs by generic names over brand names with the objective of reducing the cost of therapeutic intervention with drugs. Of the 1477 incidences of drug usage in the current study 986 prescriptions (66.76%) w ere for branded products, 298 prescriptions (20.17%) were for products covered under NLEM and 193 prescriptions were by generic name, findings are summarized in Table 8. Higher incidences of prescriptions by brand names in the current study is in deviation of rational usage.

Another step followed to achieve rationality in drug usage is to reduce the number of antibiotics that a patient is administered during the course of drug therapy.

The idea is aimed at reducing the chances of drug interactions, adverse reactions and development of drug resistant microorganisms. Among the total 200 cases, there were 41 prescription contained single antibiotics, 90(45%) prescription contain two antibiotics followed by 62 prescriptions were contain three antibiotics. 3.5% (prescription) contain 4-5 antibiotics. Rationality in usage of antibiotics appears to be followed well as evident from the data obtained from the study [51].

Drug consumption data were expressed as DDD/100 beds/ day. The highest value of 41.020 was accounted for Azithromycin indicating that it was the popular drug of choice, followed by cefixime and cefpodoxime with the value of 37.708 the results are summarized in Table 10.

Comparision of PDD against DDD for the antibiotics provided in the ATC classification revels that PDD for Azithromycine, Ceftriaxone and Ampicillin is greater than the DDD assigned in ATC, PDD for Amikacin, Cefixime and Ciprofloxacin is less than the DDD assigned in ATC and PDD for Amoxicillin, Cefpodoxine and Levofloxacine is equal to the DDD assigned for them in ATC.

CONCLUSION

Respiratory tract infection in general can cause restricted activities like loss of time from work and school etc. Along with this inappropriate and excessive treatment of these infections will contribute to the resistance of susceptible pathogens and this can lead to the re-hospitalization of patients. The reason for admission to hospitals might be the recurrent infection as the chief complaints but almost patients were treated with the same or alternative antibiotics without any culture or sensitivity tests. In this study most of the cases were not assessed by sputum culture, antibiotic sensitivity test and lung function test. This type of treatment was mainly seen in patients with non specific URTI.

The current study was aimed to determine the prescribing pattern of antibiotics in a tertiary care hospital and determine its rationality. Drug utilization pattern was studied using a total of 200 patients with respiratory tract infection, who needed intervention with antibiotic.

DU studies have the potential to make objective evaluation and analysis of health professionals work and provide a feedback to stimulate thinking about the practice and looking for ways to improve the performance. In this study most of the drugs were prescribed by brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control. Generic drugs are more economic than branded one and this can be easily affordable by the patients. More over that many drugs are selected from NLEM.

By providing antibiotic formulary and guidelines for proper antibiotic use, the prescribing pattern of antibiotics and control of its use can be improved. By analyzing the prescriptions it was found that most of the antibiotics are prescribed in poly antibiotic form to treat the infection.

From the results it was found that most commonly used antibiotic was Azithromycin and Ceftriaxone for the treatment of both upper and lower respiratory tract infection.

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Nil

CONFLICT OF INTEREST

No interest

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