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Assessment of Antibiotics Used in Respiratory Tract Infections by Improving Medication Adherence and Quality of Life in General Medicine Department

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ABSTRACT

Medical adherence is defined as the extent to which a patient's taking of medication is consistent with medical or health advice. Non-adherence to medications is particularly important in clinical practice. Adherence to medications has long been a concern because it often affects the outcome of treatment. The need of present study is to classify different types of Respiratory tract infections and antibiotics used to treat such infections. The aim of this study is to assess the efficacy of different classes of antibiotics in treatment of RTI, to promote medication adherence/ compliance and to improve quality of life by providing patient counselling. This is a prospective observational study conducted among 100 patients with respiratory tract infections in department of general medicine ward of a tertiary care hospital, over a period of 6 months. The materials used were Patient Information Leaflets (PILs), patient's profile form, Morisky medication scale and SF 36 questionnaire. The obtained data was analysed statistically. Almost all the patients were prescribed with antibiotics. It was found that Beta-lactams were the most prescribed for respiratory tract infections. At the end of the study, 1(1%) of population were very poorly adherent, 3(3%) were poorly adherent 46 (46%) were slightly adherent and 50(50%) of population were completely adherent to the medications prescribed. On comparing, QOL on day 1 and day 5, the day 5 parameters showed an increase in mean value when compared to mean value of day 1. The most commonly prescribed antibiotics for respiratory tract infections were cephalosporin, macrolides, penicillins and quinolones. The participants of the study were found to be mostly compliant to their therapy. The quality of life of the subjects improved mostly due to adequate patient counselling, reminders and regular follow ups.



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INTRODUCTION

A respiratory tract infection (RTI) is any of a number of infectious diseases involving the respiratory tract. An infection of this type is normally further classified as an upper respiratory tract infection (URI or URTI) or a lower respiratory tract infection (LRI or LRTI). Lower respiratory infections, such as pneumonia, tend to be far more serious conditions than upper respiratory infections, such as the common cold. The majority of pulmonary infections follow colonization of the upper respiratory tract with potential pathogens, whereas microbes less commonly gain access to the lungs via the blood from an extra pulmonary source or by inhalation of infected

aerosol particles. The competency of a patient's immune status is an important factor influencing the susceptibility to infection, etiologic cause and disease severity.

Types

Upper respiratory tract infections (URTI's)

The upper respiratory tract is generally considered to be the airway above the glottis or vocal cords, sometimes it is taken as the tract above the cricoid cartilage. This part of the tract includes the nose, sinuses, pharynx, and larynx.

Typical infections of the upper respiratory tract tonsillitis, pharyngitis, laryngitis, sinusitis, otitis media, certain types of influenza, and the common cold [1]. Symptoms of URIs can include cough, sore throat, runny nose, nasal congestion, headache, low grade fever, facial pressure and sneezing.

Lower respiratory tract infections (LRTI's)

The lower respiratory tract consists of the trachea (wind pipe), bronchial tubes, the bronchioles, and the lungs. Lower respiratory tract infections are generally more serious than upper respiratory infections. LRIs are the leading cause of death among all infectious diseases [1]. The two most common LRI's are bronchitis's and pneumonia [2]. Influenza affects both the upper and lower respiratory tracts, but more dangerous strains such as the highly pernicious H5N1 tend to bind to receptors deep in the lung [3]. There are theoretical reasons why treatment with antibiotic classes may aid recovery more than others, but empirical, pragmatic evidence is lacking. We investigated whether treatment with an antibiotic class was more strongly associated with symptom score resolution and time to patients reporting recovery than each of other antibiotic classes. Medical adherence is defined as the extent to which a patient's taking of medication is consistent with medical or health advice. Non-adherence to medications is particularly important in clinical practice. Adherence to medications has long been a concern because it often affects the outcome of treatment. The need of present study is to classify different types of Respiratory tract infections and antibiotics used to treat such infections. Adherence to medications has long been a concern because it often affects the outcome of treatment. Health Related Quality of Life (HRQOL) of patients is also evaluated by using questionnaires. HRQOL is a multi-dimensional concept that includes domains related to physical, mental, emotional and social functioning.

Aim of the Study

The aim of the study is to monitor compliance to

treatment with antibiotics in the management of Respiratory Tract Infections.

Objectives

1. To assess the efficacy of different classes of antibiotics in treatment of RTI.
2. To promote medication adherence/ compliance
3. To improve quality of life by providing patient counselling.

MATERIALS AND METHODS

A prospective observational study was conducted among 100 patients with respiratory tract infections in in-patient department of general medicine ward of a tertiary care hospital. The study was conducted over a period of 6 months. The subjects were selected based on inclusion and exclusion criteria. Patients will be monitored from the date of admission till the date of discharge. Patient Information Leaflets (PILs) are also provided to improve the medication adherence and Quality of Life of patients. Data was collected from the patients through direct interviews using patient's profile form, Morisky medication scale and SF 36 questionnaire. The obtained data was analysed statistically.

RESULTS

In the current study, a total of 100 prescriptions were included as per inclusion and exclusion criteria, out of which 56% were males and 44% were females. Maximum number of patients, 33(33%) were found between 34-45 years and minimum number of patients, 2(2%) between the age groups 78-89 years and 81-90. The maximum age of the study population was 89 and minimum age of the patient was 23. The mean age of the study population was found to be 48.4 years. Patients are most commonly affected with Lower Respiratory Tract Infections (68%) than Upper Respiratory Tract Infections (32%) and this data was tabulated in Table 1. Almost all the patients are prescribed with antibiotics. It was found that Cephalosporins 55 (24.1%), Macrolides 55 (24.1%), Beta-lactams 77 (33.7%), Tetracyclines 1 (0.4%), Fluoroquinolones 26 (11.4%), Aminoglycosides 9 (3.94%), Carbapenems 5 (10.9%) were the various antibiotics prescribed for respiratory tract infections and the data depicted in Figure 1. Of all the antibiotics Beta lactams were mostly used for almost all types of respiratory tract infections. The adherence patterns were classified into excellent adherence, acceptable adherence over time, declining adherence, non-

adherence to consistently correct dosing and unacceptable adherence and their scoring was tabulated in Table 2. At the end of the study; out of 100 population selected for study 1(1%) of population were very poorly adherent, 3(3%) were poorly adherent 46 (46%) were slightly adherent and 50(50%) of population were completely adherent to the medications prescribed. The medication adherence of the patients on day 01 and day 07 were depicted in Figures 2 and 3 respectively. Self evaluation of health status was performed using modified and shortened SF-36 questionnaire. Health status is assessed using physical and mental components in eight dimensions and these factors analyzed were tabulated in Tables 3 and 4.

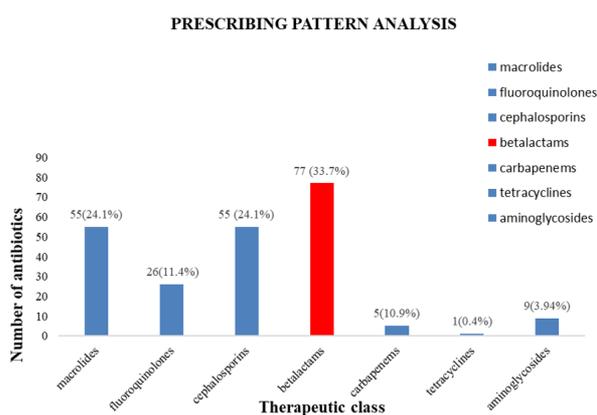


Figure 1: Prescribing patterns of antibiotics

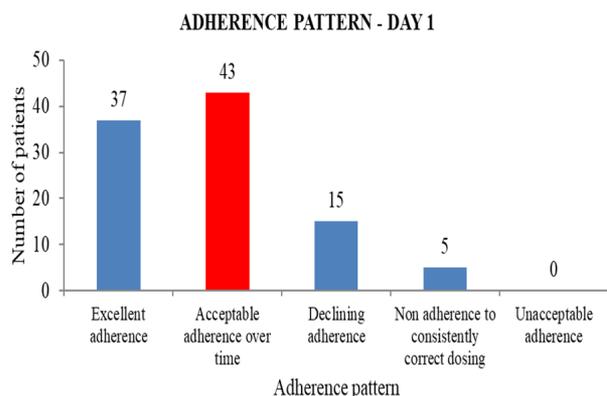


Figure 2: Patient distribution based on Adherence pattern -Day 1

1. Physical functioning
2. Role limitations due to physical health
3. Role limitations due to emotional problems
4. Energy/ fatigue
5. Social functioning
6. Emotional well being

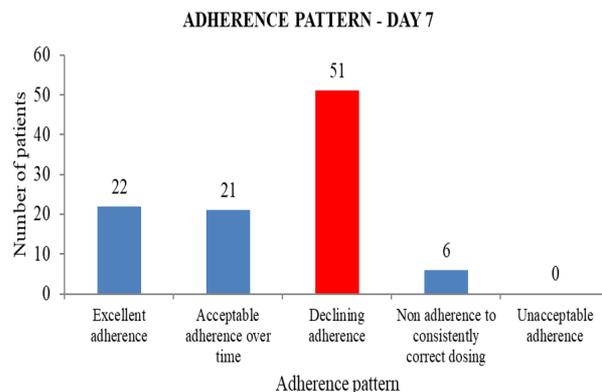


Figure 3: Patient distribution based on Adherence pattern -Day 7

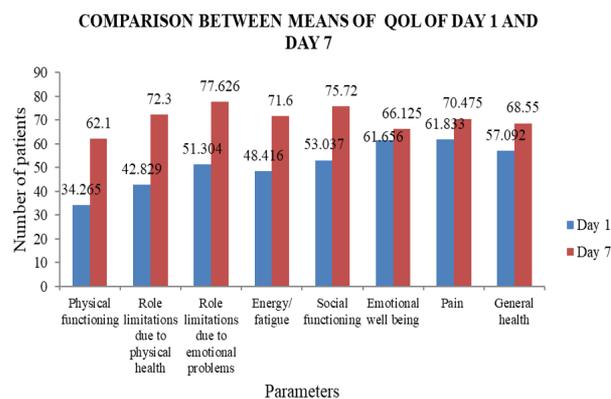


Figure 4: Comparison Between Means of QOL of Day 1 and Day 7

7. Pain
8. General health

HRQOL was categorized into 8 parameters such as physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/ fatigue, social functioning, emotional well-being, pain and general health. On comparing all the 8 components of QOL on day 1 and day 5, the day 5 parameters showed an increase in mean value when compared to mean value of day 1. This shows there is an improvement in QOL of patients on day 5 (at the end of study) when compared to day 1 and this comparison was depicted in Figure 4.

DISCUSSION

In the current study, a total of 100 prescriptions were included as per inclusion and exclusion criteria, out of which 56% were males and 44% were females. This reveals that the incidences of the Respiratory tract infections are slightly more in males than the females. When the demographic profiles of the patients were done it was found that 16% of

Table 1: Patient distribution based on Classification

Classification	No.of patients	Percentage
LRTI	68	68%
URTI	32	32%
TOTAL	100	100%

Table 2: Scoring of Adherence pattern

Type of adherence pattern	Score given
Excellent adherence	4
Acceptable adherence over time	3
Declining adherence	2
Non-adherence to consistently correct dosing	1
Unacceptable adherence	0

Table 3: Analyzing the factors on Follow-up - 1

Days	Physical functioning		Role limitations due to physical health		Role limitations due to emotional problems		Energy/ fatigue	
	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
Day 1	34.265	10.805	42.829	25.758	51.304	32.808	48.416	10.077
Day 7	62.1	12.593	72.3	17.796	77.626	18.317	71.6	6.887

Table 4: Analyzing the factors on Follow-up - 2

Days	Social functioning		Emotional well being		Pain		General health	
	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
Day 1	53.037	16.784	61.656	14.838	61.833	15.139	57.092	13.367
Day 7	75.72	17.132	66.125	13.380	70.475	9.237	68.55	13.024

the patients belonged to the age group 23 – 34 years, 33% to the age group 34 – 45 years, 25% to the age group 45 – 56 years, 16% to the age group 56 – 67 years, 8% to the age group 67 – 78 years and 2% to the age group 78 – 89 years.

In the present study, 32% of the cases were of URTI. Out of this, 34.3% cases were URTI (unspecified), 21.8% were Sinusitis, 25% were Pharyngitis, and 18.7 were Chronic Suppurative Otitis Media (CSOM). Our study stated that among URTI maximum cases were unspecified URTI and minimum cases were CSOM. Our study was similar to the study Divya Kancherla et al. [4].

In this study, 68% of the cases were LRTI. The out of this, 47% cases were Pneumonia, 8.82% cases were Bronchopneumonia, 10.2% cases were Acute bronchitis, 5.8% cases were Chronic bronchitis and 27.9% cases were LRTI (unspecified). Our study stated that among LRTI, the maximum cases were

Pneumonia and the minimum cases were Chronic bronchitis.

This study also stated that the incidence of Lower Respiratory Tract Infections (LRTIs) were higher than the Upper Respiratory Tract Infections (URTIs). Our study was similar to the study of Carl Llor, Silvia et al. [5].

This study reported that 4 antibiotics were mainly prescribed in URTI. Out of these 18.8% were Azithromycin, 9.09% were Levofloxacin, 13.63% were Ceftriaxone, 31.81% were Piperacillin + Tazobactam combination. Our study was similar to the study Przemyslaw Kardas et al. [6].

The most commonly prescribed antibiotic for URTI was Piperacillin + Tazobactam combination.

Out of 4 antibiotics prescribed in CSOM 2 (15.3%) were Azithromycin, 5 (38.4%) were Ceftriaxone, 5 (38.4%) were Ofloxacin. 1 (7.69%) were Piperacillin + Tazobactam. The commonly used antibiotics for

CSOM were Ceftriaxone and Ofloxacin.

Out of 6 antibiotics prescribed in pharyngitis 4 (30.76%) were Azithromycin, 3 (23.07%) were Levofloxacin, 1 (7.69%) were Ceftriaxone, 1 (7.69%) were Ofloxacin, 2 (15.38%) were Piperacillin + Tazobactum and 2 (15.38%) were Amikacin. Most prescribed antibiotic for Pharyngitis was Azithromycin.

Out of 6 antibiotics prescribed in Sinusitis 4 (26.6%) were Azithromycin, 6(40%) were Levofloxacin, 1 (6.6%) were Ceftriaxone, 1 (6.6%) were Ofloxacin, 2 (13.3%) were Piperacillin +Tazobactum and 1 (6.6%) were Amikacin. Most prescribed antibiotic for Sinusitis was Levofloxacin.

Out of 9 antibiotics prescribed in LRTI (unspecified) 27 (30%) were Ceftriaxone, 24 (26.6%) were Piperacillin + Tazobactum, 23 (25.5%) were Azithromycin, 11 (12.2%) were Amoxicillin + Clavulanic acid, 1 (1.1%) were Clarithromycin, 1 (1.1%) were Levofloxacin, 1 (1.1%) were Meropenem, 1(1.1%) were Doxycycline, 1 (1.1%) were Cefpodoxime. Most prescribed Antibiotic for LRTI was Ceftriaxone.

Out of 6 antibiotics prescribed for Bronchopneumonia, 2 (16.6%) were Ceftriaxone, 3 (25%) were Piperacillin + Tazobactum, 2 (16.6%) were Azithromycin, 3 (25%) were Amoxicillin + Clavulanic acid, 1 (8.3%) were Cefperazone, 1 (8.3%) were Meropenem. The most prescribed antibiotics for Bronchospasm were the combinations of Piperacillin + Tazobactum and Amoxicillin + Clavulanic acid.

Out of 6 antibiotics prescribed for Bronchitis, 3 (20%) were Ceftriaxone, 6 (40%) were Piperacillin+Tazobactum, 1 (6.6%) were Clarithromycin, 2 (13.3%) were Levofloxacin, 2 (13.3%) were Cefperazone, 1 (6.6%) were Cefotaxime. Most prescribed antibiotic was Piperacillin+ Tazobactum.

Out of 4 antibiotics prescribed for Chronic bronchitis, 3 (37.5%) were Piperacillin+Tazobactum, 1 (12.5%) was Amoxicillin + Clavulanic acid, 3 (37.5%) were Clarithromycin, 1 (12.5%) was Cefoperazone. The most prescribed antibiotics were Piperacillin + Tazobactum combination and Clarithromycin.

Out of 9 antibiotics prescribed for unspecified LRTI 6 (12.5%) were Ceftriaxone, 6 (12.5%) were Piperacillin+Tazobactum, 11 (22.9%) were Azithromycin, 10 (20.8%) were Amoxicillin + Clavulanic acid, 5 (10.4%) were Levofloxacin, 4 (8.3%) were Cefperazone, 1 (2.08%) were Meropenem, 3 (6.25%) were Cefotaxime, 2(4.16%) were Feropenem. Most prescribed antibiotic was

Azithromycin.

The study also stated that almost all the patients are prescribed with antibiotics. It was found that Cephalosporins 55 (24.1%), Macrolides 55 (24.1%), Beta-lactams 77 (33.7%), Tetracyclines 1 (0.4%), Fluoroquinolones 26 (11.4%), Aminoglycosides 9 (3.94%), Carbapenems 5 (10.9%) were the various antibiotics prescribed for respiratory tract infections. The maximum antibiotics prescribed for RTIs belong to the class of Beta lactams and the minimum to the class of Tetracyclines. Our study was similar to the study J.Macfarlane, S.A.Lewis et al. [7].

Adherence patterns were studied on day 1, 3 and 5. On day 1, out of 100 patients no patient showed excellent adherence, 69 patients showed acceptable adherence over time, 29 patients showed declining adherence, 2 patients showed non-adherence to consistently correct dosing and no patient showed unacceptable adherence. On day 3, out of 100 patients 12 patients showed excellent adherence, 72 patients showed acceptable adherence over time, 16 patients showed declining adherence and no patient showed non-adherence to consistently correct dosing or unacceptable adherence. On day 5, out of 100 patients 37 patients showed acceptable adherence, 43 patients showed acceptable adherence over time, 15 patients showed declining adherence, 5 patients showed non-adherence to consistently correct dosing and no patient showed unacceptable adherence. Our study was similar to the studies of Heather P. McDonald, et al., Tanja Kastien-Hilka [8, 9].

Out of 100 study population 56 were male and 44 were female subjects. Out of 56 male subjects 17 subjects showed less compliance and 39 subjects were fully compliant. Out of 44 female subjects 13 were less complaint and 31 subjects were fully compliant to the medication therapy. The study suggested that male population were a bit more compliant than female population.

Out of 16 subjects of the age group 23-34, 3 subjects were less adherent, and 13 subjects were adherent. Out of 33 subjects in the age group of 34-45, 3 were less adherent and 30 subjects were adherent to the therapy. Out of 25 subjects in the age group of 45-56, 5 subjects were less adherent and 20 subjects were adherent. Out of 16 subjects in the age group of 56-67, 2 subjects were less adherent and 14 subjects showed good adherence.

Out of 8 subjects in the age group of 67-78, 2 were less adherent and remaining 6 subjects showed good adherence. Out of 2 subjects in the age group of 78-89 all the two patients showed good compliance to the medication therapy. The age group of 34-45 showed good adherence pattern when compared to

other age groups.

The mean adherence was 2.67 on day 1, which was slightly less than day 3, which is 2.74. On day 5, the mean adherence was found to increase to 2.98. Out of 100 population selected for study 1(1%) of population were very poorly adherent, 3(3%) were poorly adherent, 46(46%) were slightly adherent and 50(50%) of population were completely adherent to the medications prescribed. Thus the study shows an increase in adherence from day 1 to day 7. Our study is similar to the studies of Bernard Vrijens et al., Rina Rosalia et al. [10, 11]. Self evaluation of health status was performed using modified and shortened SF-36 questionnaire. Health status is assessed using physical and mental components in eight dimensions. QOL analysis was performed on day 1 and day 5 to find out any improvement in quality of life at the end of the study. On comparing all the 8 components of QOL on day 1 and day 5, the day 5 parameters showed an increase in mean value when compared to mean value of day 1. This shows there is an improvement in QOL of patients on day 5 (at the end of study) when compared to day 1. Out of 100 subjects the QOL of 1 subject (1%) was very poor (no change), the QOL of 4 subjects (4%) was slightly improved, the QOL of 45 (45%) of subjects was improved and 50 subjects (50%) showed complete improvement in QOL at the end of the study. Our study is similar to the studies of Teul, S. Baran Jeffrey et al., A. Linder et al. [12, 13].

CONCLUSION

The most commonly diagnosed disease among respiratory tract infections in the in-patient department of general medicine was found to be LRTI. The most commonly prescribed antibiotics for respiratory tract infections were cephalosporin, macrolides, penicillins and quinolones. Two drug combinations of antibiotics were more prescribed than monotherapy and triple therapy. The participants of the study were found to be mostly compliant to their therapy and majority of the patients were found to be adequately counselled about the importance of antibiotic compliance and prescribed antibiotic regimen. The quality of life of the subjects improved mostly due to adequate patient counselling, reminders and regular follow ups.

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Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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