

# EVALUATION OF INAPPROPRIATE PRESCRIBING TRENDS OF ANTIBIOTICS IN UPPER RESPIRATORY TRACT INFECTIONS, AMONG OUTPATIENTS

Shaima Rana\*, Hina shabeer., Rida Abid and Saleha Sadeeqa

## Abstract

**Background:** Inappropriate prescribing trend of antibiotics is currently one of the major public health issues worldwide. This misuse lead to the development of bacterial resistance, increasing the burden of chronic diseases, rising costs of health services, and the development of side effects. **Objectives:** This study will evaluate the pertinent factors contributing to the overuse of antibiotics worldwide.

**Methods:** A cross-sectional study design was adopted using convenient sampling technique, during the period June-2017 to August-2017. A sample size of 100 patients was taken and data was collected from three major hospitals of Lahore Pakistan. A data collection form was designed and was filled during face to face interviews with the patients, and physicians. Data was presented in percentage. **Results:** The study showed that 25% of the patients were prescribed clarithromycin, 22% ciprofloxacin, 13% prescribed cephalexin, 10% erythromycin and 30% of the patients were prescribed amoxicillin. 40% of the physicians prescribed two drug combinations and 60% prescribed three drug combination therapies to the patients.

**Conclusion:** It was concluded that misuse of antibiotics in Upper Respiratory Tract Infection is a major problem in Pakistan. Since Upper Respiratory Tract Infection forms a large proportion of the reason for primary care consultations in this area, inappropriate use of antibiotic in both quantity and drug choice employ major selective pressure on the occurrence of antibiotic resistance.

**Key Words:** Antibiotics, Inappropriate Use, Prescribing Trends, Adults, Upper Respiratory Tract Infections.

## INTRODUCTION

Viral infections including the common cold, sore throats and flu remain ineffective by the use of antibiotics<sup>[1]</sup>. The inappropriate use of antibiotics for the treatment of 'the upper respiratory tract infections (URTIs)' in children and adults, and the emergence of resistant bacteria is a growing public health concern <sup>[2]</sup>. The bacterial resistance and an increase burden of chronic diseases are a cause of inappropriate use of antibiotics. This result in an increasing number of side effects and the cost of services in health sectors is also increasing day by day. The inappropriate use of antibiotics is influenced by several factors <sup>[3]</sup>.

The non-specific term; URTI, is used to define acute infections involving 'the nose, Para-nasal sinuses, larynx, pharynx, bronchi and trachea'. The prototype; known as the common cold, is the illness which in addition to 'sinusitis, trachea-bronchitis and pharyngitis', is discussed here. A systemic ailment, involving the upper respiratory tract i.e. known as influenza, should be differentiated from other URTIs.

The repeated circulation of 'respiratory viruses' in the community is due to antigenic discrepancy of these viruses. 1% to 2% visits of patients in the OPD and emergency are due to acute pharyngitis including 7 million of adults annually <sup>[4]</sup>. 0.5% to 2% of cases of viral URTIs are due to acute bacterial sinusitis including 20 million cases annually in the U.S. <sup>[5]</sup>.

The symptoms of URTI occur in 1 to 3 days after the patient is being exposed to the infection causing agent. The main symptoms of common cold are nasal congestion, sore throat and sneezing <sup>[6]</sup>.

Acute trachea-bronchitis is a disease which lasts for 1 to 3 weeks and its main symptoms are dry cough, or cough with sputum production, or wheezing. The main symptoms of Influenza are high fever, myalgia, headache and fatigue <sup>[7]</sup>. Patients suffering from common colds are physically examined and are diagnosed with 'a low-grade fever, nasal vocal tone, macerated skin over the nostrils, and inflamed nasal mucosa' <sup>[8]</sup>.

Most URTIs were diagnosed by the patients themselves and self-treated. 'Reassurance, education, and instructions' are important for symptomatic home treatment. Symptom-based therapy is considered important for URTI treatment in immune-competent adults, although antiviral therapy is appropriate in selected patients.

Three basic principles regarding the effective use of antibiotics in order to treat URTIs (including acute otitis media, bacterial infection, bacterial sinusitis) were released by the American Academy of Pediatrics in November 2013 <sup>[9]</sup>. These principles include the diagnosis of the infection caused by bacteria, prescribing of most appropriate antibiotic and shortest duration taken to treat the infection. The bacterial infections are distinguished from the viral infections on the basis of these principles.

This study will evaluate the pertinent factors which contribute to the overuse of antibiotics worldwide, and also help in assessing the evaluation strategies required to limit this overuse.

## MATERIALS AND METHODS

A cross-sectional study design was adopted using convenient sampling technique, during the period June-2017 to August-2017.

100 sample sizes were taken and study carried out in three major hospitals of Lahore Pakistan were Gulab Devi Chest Hospital, Doctor's Hospital, and Services Hospital.

**Inclusion and Exclusion Criteria:** Patients with upper respiratory tract infections were included in this research study while the patients with no upper respiratory tract infections were excluded from this research study.

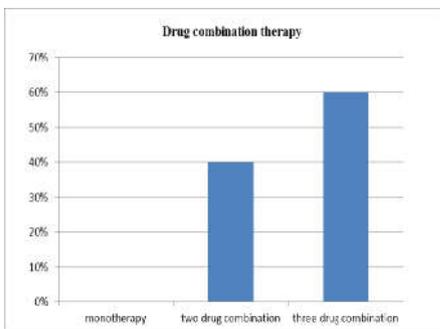
**Ethical Considerations**

The study was conducted after obtaining ethical approval from the Institute of Pharmacy of Lahore College for Women University. The institute provided ethical approval after assessing informed verbal consent submitted with all components of the research protocol. The verbal consent of questionnaire was asked before data filling. The participants for the study were asked whether they were willing or unwilling after hearing about the consent of the study and this was confirmed by their response shown as yes or no. Data collection was carried out after the confirmation of the willingness of the participant. The data was recorded anonymously in order to ensure confidentiality and privacy of the participant.

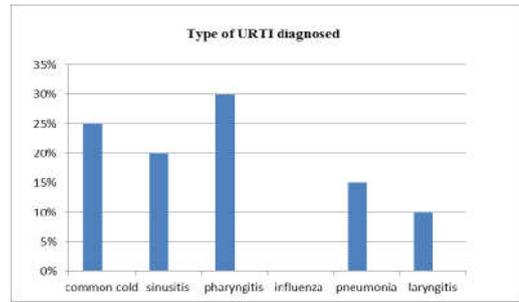
**RESULTS**

**Table 1** shows about Age and gender distribution, signs and symptoms, Health care sectors and the possible side effects during treatment.

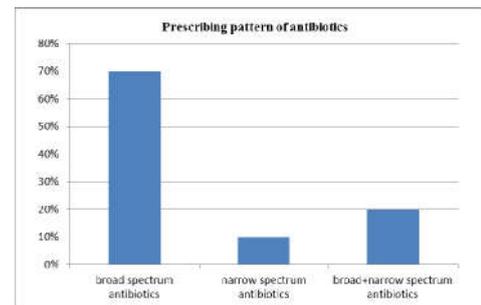
Gender Distribution	
Male	60%
Female	40%
Age Distribution	
20-30 yrs	20%
30-40 yrs	40%
40-50 yrs	10%
50-60 yrs	30%
Signs and Symptoms	
Cough	10%
Nasal discharge	10%
Sneezing	25%
Fever	15%
Sore throat	20%
More than one symptom	20%
Health care sectors	
Private hospitals	65%
Public hospitals	35%
Side effects	
Nausea	45%
Abdominal pain	20%
Cramping	35%



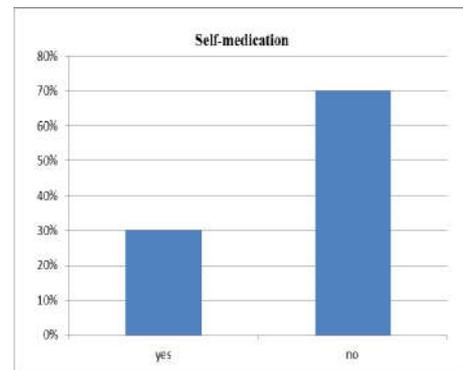
**Figure 1** shows single drug was not prescribed by any doctor to the patients of URTI while 40% of the doctors prescribed two drug combinations and 60% prescribed three drug combination therapies to the patients suffering from URTI.



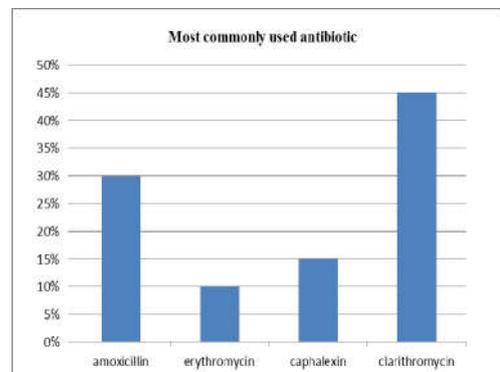
**Figure 2** shows 25% of the patients were diagnosed with common cold, 20% of the patients were diagnosed with sinusitis, 30% of the patients were diagnosed with pharyngitis, none of the patients were diagnosed with influenza, and 15% of the patients were diagnosed with pneumonia while 10% of the patients were diagnosed with laryngitis.



**Figure 3** shows 70% of the doctors prescribed broad spectrum antibiotics, 10% prescribed narrow spectrum antibiotics while 20% of the doctors prescribed broad + narrow spectrum antibiotics to the patients suffering from URTI's.



**Figure 4** shows 30% of the patients follow self-medication while 70% of the patients follow no self-medication.



**Figure 5** shows 45% of the patients were prescribed clarithromycin, 15% of the patients were prescribed cephalexin while 10% of the patients were prescribed erythromycin and 30% of the patients were prescribed amoxicillin.

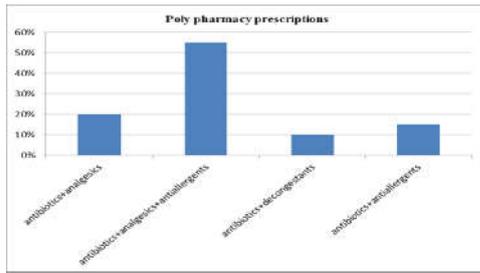


Figure 6 shows Poly pharmacy along with antibiotics and analgesics in 20% of the prescriptions, poly pharmacy along with antibiotics, analgesics and anti-allergens was observed in 55% of the prescriptions while poly pharmacy along with antibiotics and decongestants was observed in 10% of the prescriptions and poly pharmacy along with antibiotics and anti-allergens was observed in 15% of the prescriptions.

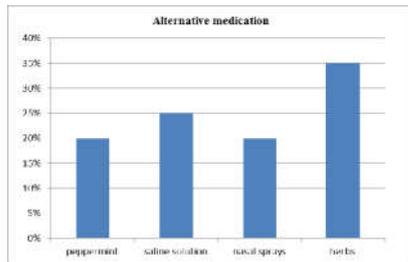


Figure 7 shows 35% of the patients used herbs, 20% of the patients used nasal sprays, 25% of the patients used saline solution and 20% of the patients used peppermint as alternative medication.

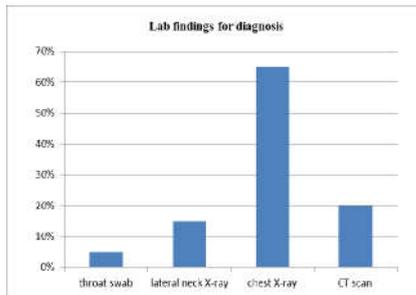


Figure 8 shows 5% of the doctors used throat swab, 15% of the doctors used lateral neck X-ray, 65% used chest X-ray and 20% used CT scan for diagnosis of different URTI's.

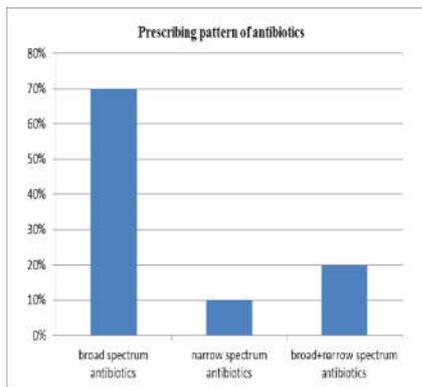


Figure 9 shows 70% of the doctors prescribed broad spectrum antibiotics, 10% prescribed narrow spectrum antibiotics while 20% of the doctors prescribed broad + narrow spectrum antibiotics to the patients suffering from URTI's.

## DISCUSSION

This study was done to observe the inappropriate use of antibiotics in URTIs. Either prescribing antibiotics for a viral

ailment or use of non-specific broad spectrum antibiotics has led to increase in bacterial resistance, reducing effectiveness for many vital drugs, developing of side effects, enhancing the burden of chronic diseases and rising costs of health services<sup>[26][28]</sup>.

It was found that the antibiotics prescribed for URTI's were according to office-based practices, than what is recommended by current guidelines. Almost two thirds of URTI episodes resulted in an antibiotic prescription. 75% of the episodes of acute bronchitis were treated with antibiotics despite of the fact that antibiotics are not recommended for this condition <sup>[1][35]</sup>.

Some concerns about inappropriate use of antibiotics are that it leads to un-desired cost and the probable of adverse effects for the individual taking the antibiotic. But even more important is the adverse effect on public health, because excessive use of antibiotics has led to the development of antibiotic-resistant bacteria <sup>[37][38]</sup>.

Pharmacist has to step forward to analyze the root cause of this trend by exploding his position in the community through building trusted relationship with patients and care-takers for discouraging self-medication, dispensing medications rationally, arranging educational programs for general public, communicating physicians about current guidelines for antibiotics prescribing and thus has to fight the battle for the survival of the most important drugs; Antibiotics.

Purulent secretions from the nostrils or throat are not bacterial infections and are also not treated antibiotics <sup>[39]</sup>.

Misconceptions prevail about the use and indications of antibiotics. The patients' knowledge and beliefs about antibiotics can substantially affect the way they use these medications. The causes for using antibiotics varied from one defendant to the other with higher percentages given to reason for inflammation (24%), fever (22%), and respiratory illness (21%). In terms of knowledge, Above 55% of participants agreed that antibiotics could be used to treat viral infections in general compared to 46% as reported by Curry et al. This confirms the lack of knowledge of the participants and their impotency to reconcile the differences between bacteria and viruses allied diseases<sup>[40][41][42]</sup>.

Pharmacist plays an important role in providing information regarding URTIs, Promoting Rational Use of Drugs, Evaluation of a national program in order to reduce inappropriate use of antibiotics for URTI's: effects on 'consumer awareness, beliefs, attitudes and behaviors'. Pharmacist can make strategies to decline the trend of self-medications, Pharmacist plays an important role differentiating inappropriate use of viral infection vs. bacterial infection, and Pharmacist plays an important role in improving antibiotics prescribing for upper respiratory tract infections.

URTI involves common cold, pharyngitis, sinusitis, otitis media and trachea-bronchitis. If these infections are viral then can spontaneously resolve within seven days but if illness sustain for more than a week and is more localized indicating bacterial invasion requires treatment with appropriate antibiotic which is specific against most susceptible pathogen residing the area identified by performing laboratory investigations.

## CONCLUSION

One of the major problems observed in the Asian-Pacific region is increasing inappropriate use of antibiotics in URTI. This inappropriate use of antibiotics has led to many cases of bacterial resistance as a large number of URTIs required primary care for treatment. Although, the data collected gives us important information on the above issues. From this study, it was concluded that all the health care practitioners including the physicians, pharmacists and other health care providers should be provided with important information for the appropriate use of antibiotics in URTIs in order to prevent the increasing bacterial resistance among people.

## Acknowledgment

I would like to express my special thanks of gratitude to my supervisor Dr. Saleha Sadeeqa who gave me the golden opportunity to do this wonderful project on the topic "Evaluation of inappropriate prescribing trends of antibiotics in upper respiratory tract infections, among outpatients". Secondly I would also like to thank my parents and friends who helped me a lot in this research and data collection within the limited time frame.

## References

- Little P, Gould G, Williamson I, Warner G, Gantley M, Kinmonth A. (1997). Reattendance and complications in a randomized trial of prescribing strategies for sore throat: the medicating effect of prescribing antibiotics. *British Medical Journal*, 315, 350-2.
- Nambiar S, Schwartz RH, Sheridan MJ. (2002). Antibiotic use for upper respiratory tract infections: how well do pediatric residents do? *Archives of Pediatrics & Adolescent Medicine*. *British Medical Journal*, 156 (6), 621-4.
- Akici, A., Kalaca, S., Ugurlu, U., & Oktay, S. (2004). Prescribing habits of general practitioners in the treatment of childhood respiratory-tract infections. *European Journal of Clinical Pharmacology*, 60, 211-216.
- Wessel's MR. (2011). Clinical practice: streptococcal pharyngitis. *New England Journal of Medicine*, 364, 648-655.
- Wenzel RP, (2006). Fowler AA III. Clinical practice: acute bronchitis. *New England Journal of Medicine*, 355, 2125-2130.
- Hwang PH. (2009). A 51-year-old woman with acute onset of facial pressure, rhinorrhea, and tooth pain: review of acute rhino-sinusitis. *Journal of the American Medical Association*, 301, 1798-1807.
- Vollenweider MA, Hornung CA, Simel DL, McKinney WP (2005). Does this patient have influenza? *Journal of the American Medical Association*, 293, 987-997.
- Monto AS, Bramley TJ, Sarnes M. (2003). Development of a predictive index for picornavirus infections. *Clinical Infectious Disease*, 36, 253-258.
- West, J. (2002). Acute upper airway infections: Childhood respiratory infections. *British Medical Bulletin*, 61(1), 215-23
- Girma Mamo, Abeba Teshome. (2017). Evaluation of antibiotics use in the treatment of upper respiratory tract infection in Bedele District Hospital, Southwest Ethiopia. *Journal of Scientific and Industrial Journal*, 6(1), 38-43.
- Anne Meneghetti, (2017). Upper Respiratory Tract Infection Treatment & Management. *Medscape*, 2, 19-20.
- Sara Malo, Lars Bjerrum, Cristina Feja1, (2014). Compliance with Recommendations on Outpatient Antibiotic Prescribing for Respiratory Tract Infections: The Case of Spain. *Basic & Clinical Pharmacology & Toxicology*, 116, 337-342.
- CL Teng, (2014). Antibiotic prescribing for upper respiratory tract infections in the Asia Pacific region: A brief review. *Malaysian Family Physician*, 9(2), 18-25.
- Lisha J. John, Meenu Cherian, Jayadevan Sreedharan and Tambi Cherian, (2012). Patterns of Antimicrobial therapy in acute tonsillitis: A cross-sectional Hospital-based study from UAE. *Annals of the Brazilian Academy of Sciences*, 86(1), 451-457.
- Al-Faris, E., & Al-Taweel, A. (1999). Audit of prescribing patterns in Saudi primary health care: What lessons can be learned? *Ann Saudi Med*, 19(4), 317-321
- Emanuele, P. (2010). Antibiotic Resistance. *AAOHN Journal*, 58(9), 363-365
- Mainous, A., & Hueston, W. (1998). The Cost of Antibiotics in Treating Upper Respiratory Tract Infections in a Medicaid Population. *Achieve of Family Medicine*, 7(1), 45-49
- Mainous, A., Hueston, W., Davis, M., & Pearson, W. (2003). Trends in Antimicrobial Prescribing for Bronchitis and Upper Respiratory Infections among Adults and Children. *American Journal of Public Health*, 93(11), 1910-1914
- Bi, P., Tong, S., & Partonc, K. (2000). Family self-medication and antibiotics abuse for children and juveniles in a Chinese city. *Social Science & Medicine*, 50(10), 1445-1450
- Hughes CM, McElnay JC, Fleming GF (2001). Benefits and risks of self-medication. *DrugSafe*. *British Medical Journal*, 24, 1027-37.
- Holloway KA, Karkee S, Tamang A, Gurung Y, Pradhan R, Reeves B (2009). Community intervention to promote rational treatment of acute respiratory tract infection in rural Nepal. *Tropical Medicine and International Health*, 14(1), pp.1-10.
- Snow V, Mottur-Pilson C, Gonzales R. (2001). Principles of appropriate antibiotic use for treatment of nonspecific upper respiratory tract infections in adults. *Annals of Internal Medicine*, 134, 487-9.
- Badiger S, Kundapur R, Jain A, Kumar A, Pattanshetty S, et al. (2012) Self-medication patterns among medical students in South India. *Australas Med Journal*, 5(4), 217-220.
- Ali SE, Ibrahim MIM, Palaian S (2010). Medication storage and self-medication behavior amongst female students in Malaysia. *Pharmacy Practice*, 8(4), 226-232.
- Suleman S, Ketsela A, Mekonnen Z (2009) Assessment of self-medication practices in Assendabo town, Jimma zone, southwestern Ethiopia. *Research in Social Administrative Pharmacy*, 5, 76-81.
- Parrino TA. (2004). Controlled trials to improve antibiotic utilization: a systematic review. *International Journal of Pharmacology*, 25(2), 289-298.

27. Sarahroodi, S., Arzi, A., Sawalha, A., & Ashtarinezhad, A. (2010). Antibiotics self-medication among southern Iranian university students. *International Journal of Pharmacology*, 6, 48-5.
28. Mangione-Smith, R., McGlynn, E., Elliott, M., Krogstad, P., & Brook, R. (1999). The Relationship between Perceived Parental Expectations and Pediatrician Antimicrobial Prescribing Behavior. *Pediatrics*, 103(4), 711-718.
29. Gonzales, R., Barrett, P., Crane, L., & Steiner, J. (1998). Factors associated with antibiotic use for acute bronchitis. *Journal of General Internal Medicine*, 13(8), 541-548.
30. Goolsby, M. (2001). Viral Upper Respiratory Infections. *Journal of the American Academy of Nurse Practitioners*, 13(2), 50-54.
31. Mainous, A., Hueston, W., Davis, M., & Pearson, W. (2003). Trends in Antimicrobial Prescribing for Bronchitis and Upper Respiratory Infections among Adults and Children. *American Journal of Public Health*, 93(11), 1910-1914.
32. Kunin, C., Lipton, H., Tupasi, T., Sacks, T., Scheckler, W., Jivani, A., et al. (1987). Social, Behavioral, and Practical Factors Affecting Antibiotic Use Worldwide: Report of Task Force 4. *Reviews of Infectious Diseases*, 9(3), 270-285.
33. Macfarlane, J., Holmes, W., Macfarlane, R., & Britten, N. (1997). Influence of patients' expectations on antibiotic management of acute lower respiratory tract illness in general practice: questionnaire study. *British Medical Journal*, 315(7117), 1211-1214.
34. Snow V, Mottur-Pilson C, Gonzales R. (2001). Principles of appropriate antibiotic use for treatment of acute bronchitis in adults. *Annals of Internal Medicine*, 134, 518-20.
35. Peche're, J. (2001). Patients Interviews and Misuse of Antibiotics. *Clinical Infectious Diseases*, 33(S3), S170-S173.
36. Dowell S, Schwartz B. (1997). Resistant pneumococci: protecting patients through judicious use of antibiotics. *American Family Physician*, 55, 1647-54.
37. Cohen M. (1992). Epidemiology of drug resistance: implications for a post antimicrobial era. *Science*, 257, 1050-5.
38. Waseem Hajjar, Sami Alnassar, Sara Al-khelb, Sarah Al-Mutairi, Norah Al-Refayi, Sultan Ayoub Meo (2017) Antibiotics use and misuse in upper respiratory tract infection patients: Knowledge, attitude and practice analysis in university hospital, Saudi Arabia, 67(9), 1387
39. Curry M, Sung L, Arroll B, Goodyear-Smith F, Kerse N, Norris Public (2006): views and use of antibiotics for the common cold before and after an education campaign in New Zealand. *New Zealand Medical Journal*, 119, U1957.
40. Jose J, Jimmy B, Alsabahi AG, Al Sabei GA. (2013) A study assessing public knowledge, belief and behavior of antibiotic use in an Omani-population. *Oman Medical Journal*, 28, 324-30.

\*\*\*\*\*