# ASSESSING THE IMPACT OF ANTIBIOTIC COUNSELING ON PATIENT KNOWLEDGE, ADHERANCE AND ANTIMICROBIAL RESISTANCE: A PROSPECTIVE STUDY

**Khaja Ashrafuddin[1]\*, Dr. Hemant Kumar Sharma[2]**

**[1]Research Scholar, Department of Pharmacy, Sri Satya Sai University of Technology and Medical Sciences, Sehore, Madhya Pradesh, India.**

**[2]Professor, Department of Pharmacy, Sri Satya Sai University of Technology and Medical Sciences, Sehore, Madhya Pradesh, India.**

**\*Corresponding Author:** Khaja Ashrafuddin

Research Scholar, Department of Pharmacy
Sri Satya Sai University of Technology and Medical Sciences, Sehore, Madhya Pradesh, India.
**Mail id:** khajaashrafuddin@gmail.com

## ABSTRACT:

**Objective:**Antibiotics have saved lives worldwide. However, overuse and misuse have led to antibiotic resistance. Antibiotic counseling is a crucial strategy to combat this crisis, promoting responsible use and providing clear information on antibiotics, side effects, and prescribed courses. This study investigates the impact of antibiotic counselling on patient understanding.

**Method:**The study aims to evaluate the effectiveness of antibiotic counseling in promoting responsible antibiotic use and reducing antibiotic resistance. Data will be collected through surveys, involving a diverse patient population and healthcare settings, and analyzed using SPSS.

**Results:**Antibiotics were prescribed based on cultures and hospital formulary, with Cefoperazone+Sulbactum being the most frequently prescribed. The antibiotic course was assessed using various parameters, like with median days of intravenous, oral, and discontinuation durations.Before counselling, only 18.75%, 9.82%, 31.25%, 4.46%, 11.6%, 61.6%,22.32 of subjects had knowledge about patient understanding, current antibiotic use, dosing regimen, monitoring parameters, adverse effects, required antibiotic use time, and antibiotic resistance. After counselling, these levels increased significantly, with 75.89%,

82.14%, 79.46%, 53.57%, 83.92%, 91.07%, 85.71% of subjects having knowledge about these parameters respectively.

**Conclusion:**Antibiotic counseling is a vital tool in combating antibiotic resistance by empowering patients, encouraging responsible use, and promoting a culture of safe antibiotic use. It improves treatment outcomes and preserves antibiotic effectiveness, contributing to a comprehensive strategy.

**Keywords:**Antibiotic counseling, antimicrobial resistance, dosing regimen, monitoring parameters, antibiotic use.

## INTRODUCTION:

One of the most important breakthroughs in medicine of the 20th century, antibiotics have transformed the way infectious diseases are treated and saved countless lives around the world. Antibiotic resistance, however, is a serious worldwide health issue brought on by the overuse and abuse of antibiotics. In the future, it may be harder to treat diseases that were formerly treatable as antibiotics grow less powerful against bacterial infections.[1] Antibiotic counselling is an essential strategy to prevent antibiotic resistance and ensure the responsible use of these life-saving medications in the midst of this escalating catastrophe.[1,2]

Antibiotic counseling is providing structured information and direction to patients on the proper use of antibiotics, possible adverse effects, and the significance of finishing antibiotic therapy. In addition to encouraging sensible antibiotic usage and patient compliance, it also helps to lessen the selective pressure that promotes antibiotic resistance.[3] The significance of patient education on antibiotic use has been acknowledged by the World Health Organization (WHO). The World Health Organization's Global Action Plan on Antimicrobial Resistance (2015) emphasizes the significance of "improving awareness and understanding of antimicrobial resistance through effective communication, education, and training" as a crucial element of country efforts to deal with this issue.[4]

Antimicrobial resistance (AMR) is a global public health threat caused by antibiotic overuse and misuse. Antibiotic counseling is a patient-focused approach to promote responsible antibiotic use. It provides clear information on antibiotics, their appropriate use, potential side effects, and the importance of completing prescribed courses. This empowers patients to make informed

decisions, reduces the selective pressure on bacteria to develop resistance, and dispels misconceptions about antibiotics. Effective antibiotic counseling contributes to the prudent use of antibiotics, aligning with national and global efforts to mitigate AMR and empowering patients to become active partners in safeguarding essential drugs for future generations.[5]

This study addresses an issue of antibiotic counselling with the goal of examining its varied effects on patient understanding, behavior, and more attempts to reduce antibiotic resistance.

## MATERIALS AND METHODS:

**Site of the study:** The study was conducted in a tertiary care hospital, Hyderabad.

**Study Design:** The study was a prospective study.

**Duration of the study:** The duration of the study was six months.

## RESULTS:

The study was carried out on 112 subjects. The results are stated below

### Table-1: Demographics

|  | No of subjects |
|---|---|
| Median Age | 65±17 |
| **Ward:** |  |
| General | 37 (33.03%) |
| ICU | 47 (41.96%) |
| Surgical | 28 (25%) |
| **Diagnosis:** |  |
| Pneumonia | 20 (17.85%) |
| UTI | 53 (47.32%) |
| SSI | 10 (8.92%) |
| Bacteremia | 8 (7.14%) |
| Sepsis | 15 (13.39%) |
| Others | 6 (5.35%) |
| **Isolate:** |  |

,

| | |
|---|---|
| Escherichia coli | 39 (34.82%) |
| Klebsiella sp | 14 (12.5%) |
| Staphylococcus sp | 22 (19.64%) |
| Streptococcus sp | 23 (20.53%) |
| Others | 14 (12.5%) |

The median age of the subjects was 65±17 years. There were 37 (33.03%) subjects from General ward, 47 (41.96%) subjects from ICU and 28 (25%) subjects from surgical ward.

Based on the diagnosis, UTI was diagnosed in 53 (47.32%) subjects, followed by pneumonia in 20 (17.85%) subjects, sepsis in 15 (13.39%) subjects, SSI in 10 (8.92%) subjects, bacteremia in 8 (7.14%) subjects and others infections in 6 (5.35%) subjects. All the subjects underwent culture test which revealed E. coli in most of the subjects i.e 39 (34.82%) subjects followed by streptococcus in 23 (20.53%) subjects, staphylococcus in 22 (19.64%) subjects, klebsiella in 14 (12.5%) subjects and other isolates in 14 (12.5%) subjects.

**Table-2: Antibiotic Prescribed**

| | No of subjects |
|---|---|
| Amoxicillin-Clavulanate | 11 (9.82%) |
| Piperacillin-Tazobactum | 21 (18.75%) |
| Cefoperazone-Sulbactum | 55 (49.10%) |
| Meropenem | 19 (16.96%) |
| Clindamycin | 6 (5.35%) |
| **Median days of Therapy** | 6±3 |

Antibiotics were prescribed based on the cultures and hospital formulary. The median days of therapy was 6±3 days. Cefoperazone+Sulbactum was most frequently prescribed i.e 55 (49.10%) subjects, followed by Piperacillin+Tazobactum in 21 (18.75%) subjects, Meropenem in 19 (16.96%) subjects, Amoxicillin+Clavulanate in 11 (9.82%) subjects and Clindamycin in 6 (5.35%) subjects.

## Table-3: Antibiotic course

|  | No of days |
|---|---|
| Median days of Intravenous duration | 4±3 |
| Median days of oral duration | 5±2 |
| Discontinuation | 7±2 |
| Switch to oral therapy | 3±1 |
| De-escalation | 4±1 |
| Median days of total duration | 6±3 |

Different parameters were used to assess the antibiotic course. Median days of intravenous duration was 4±3 days, median days of oral duration was 5±2 days, discontinuation was suggested at 7±2 days. There was switch to oral therapy in 3±1 days, de-escalation in 4±1 days. For the antibiotic course, median days of total duration was 6±3 days.

## Table-4 Counselling parameters

|  | Yes | No |
|---|---|---|
| Any comorbidities | 65 (58.03%) | 47 (41.96%) |
| Previous exposure to antibiotics | 36 (32.14%) | 76 (67.85%) |
| Awareness of side-effects due to antibiotics | 11 (9.82%) | 101 (90.17%) |
| Adherence to medications | 47 (41.96%) | 65 (58.03%) |

Patients were counselled or interviewed. Based on the comorbidities reported, 65 (58.03%) subjects had comorbidities and 47 (41.96%) had no comorbidities. When enquired about previous exposure to antibiotic, 36 (32.14%) subjects were prescribed with antibiotic before and 76 (67.85%) were not prescribed antibiotics before. There were 11 (9.82%) subjects who had awareness and 101 (90.17%) subjected who had no awareness about the side effects related to their antibiotics. The adherence to medications were also recorded and revealed 47 (41.96%) subjects were adherent and 65 (58.03%) subjects were non-adherent.

**Table-5: Patient understanding before and after counselling**

| | Before Counseling | | After Counseling | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| **Patients understanding** | 21 (18.75%) | 91 (81.25%) | 85 (75.89%) | 27 (24.10%) |
| Use of current antibiotic | 11 (9.82%) | 101(90.17%) | 92 (82.14%) | 20 (17.85%) |
| Dosing Regimen | 35 (31.25%) | 77 (68.75%) | 89 (79.46%) | 23 (20.53%) |
| Monitoring parameters | 5 (4.46%) | 107 (95.53%) | 60 (53.57%) | 52 (46.42%) |
| Adverse Effects | 13 (11.6%) | 99 (88.39%) | 94 (83.92%) | 18 (16.07%) |
| Required time for antibiotic use | 69 (61.6%) | 43 (38.39%) | 102 (91.07%) | 10 (8.92%) |
| **Antibiotic resistance** | 25 (22.32%) | 87 (77.67%) | 96 (85.71%) | 16 (14.28%) |

Various parameters were compared to assess the patient understanding before and after antibiotic counselling. General patient understanding was observed and found that 21 (18.75%) subjects had little information about antibiotics and 91 (81.25%) subjects had no understanding about the antibiotics. The percentage increased drastically after counselling, where 85 (75.89%) subjects had gained information from counselling.

Before counselling, the information about use of current antibiotic was reported in 11 (9.82%) subjects and 101 (90.17%) subjects were unaware of their antibiotic use. After counselling, 92 (82.14%) subjects were counselled and aware of their antibiotic used.  Before counselling, the information about dosing regimen was reported in 35 (31.25%) subjects and 77 (68.75%) subjects were not known of their dosing regimen. After counselling, 89 (79.46%) subjects were understood and followed the dosing regimen.

Before counselling, the information about monitoring parameter the prescribed antibiotic was reported in 5 (4.46%) subjects and 107 (95.53%) subjects had no knowledge on monitoring parameters. After counselling, 60 (53.57%) subjects were counselled and aware of their antibiotic used. Before counselling, the information about adverse effect of antibiotics was reported in 13 (11.6%) subjects and 99 (88.39%) subjects were non known of the adverse effects.

After counselling, 94 (83.92%) subjects had gained information about adverse effects on their antibiotics through counselling.

Before counselling, the information about the required time for antibiotic use was reported in 69 (61.6%) subjects and 43 (38.29%) subjects were unaware of the required time for antibiotic use. After counselling, 102 (91.07%) subjects had developed understanding of antibiotic course.Before counselling, the knowledge about antibiotic resistance was reported in 25 (22.32%) subjects and 87 (77.67%) subjects had knowledge on antibiotic resistance. After counselling, 96 (85.71%) subjects had developed understanding of antibiotic resistance.

It is clearly evident that the understanding was drastically increased after counselling of patients. Patients often have limited knowledge about antibiotics, Antimicrobial Resistance (AMR), and responsible use. Misconceptions often lead to inappropriate use, such as patient demanding antibiotics for viral infections or not completing prescribed courses. Following antibiotic counseling it is clearly evident that patients should be better informed about use of current antibiotic, dosing regimen, monitoring parameters, adverse effects, required time for antibiotic use and antibiotic resistance. They should also understand resistance and its public health implications. Counseling aids in empowering patients to make informed decisions about antibiotic use, emphasizing the importance of using antibiotics only when medically necessary.

## DISCUSSIONS:

Antibiotic counselling improves patients' understanding of antibiotics and their consequences, leading to better understanding of recommended dosages, course completion, and avoiding inappropriate use. Studies by Dyar et al.[6] shows counseling-based knowledge enhancement reduces self-medication risk and helps patients choose appropriate antibiotics, thereby reducing the incidence of Antimicrobial Resistance. Adherence to prescribed antibiotic regimens is crucial for successful treatment and reducing AMR risk. Antibiotic counseling improves compliance rates and reduces premature treatment stops. Study by Huttner et al.[7] concludes comprehensive counseling interventions help patients understand consequences of non-adherence, leading to more complete courses and reduced treatment failure and resistance development.

Effective counselling promotes informed decision-making, improved treatment compliance, and less use of unneeded antibiotics. In line with international efforts to maintain antibiotic

effectiveness, it also supports the larger effort to prevent AMR by lowering the selective pressure that drives resistance and ensuring that antibiotics are only administered when clinically necessary. The effects of antibiotic counselling on patient behavior and antibiotic use have been noted in numerous research.[5,8,9,10] For instance, a study by McNulty et al.[11] found that providing patients with excellent antibiotic counselling dramatically raised their knowledge and comprehension of antibiotics, which improved adherence and decreased inappropriate antibiotic use. Additionally, research by Castro-Sánchez et al.[12] emphasized the importance of thorough counselling interventions to dispel patient misconceptions and encourage responsible antibiotic use.

Antibiotic counseling not only improves patient interactions but also contributes to public health by raising awareness about antibiotic misuse and overuse. It encourages informed patients to only use antibiotics when necessary, reducing the spread of antibiotic-related diseases. Antibiotic counseling offers health benefits, economic advantages, and reduced healthcare costs by reducing inappropriate use, improving treatment adherence, and reducing resistance-related failures.

The issues posed by AMR call for comprehensive measures as healthcare systems work to deliver safe and high-quality care. Antibiotic counselling is an essential weapon in the toolbox of healthcare professionals, not only an add-on to medical treatment. Antibiotic counselling can improve patient outcomes and advance the worldwide fight against AMR because to its all-encompassing approach to patient education and empowerment. It is our common responsibility to make sure that antibiotics are effective and accessible for future generations by ongoing research and constant counselling practice improvement.[13,14]

Numerous studies highlight the positive effect of antibiotic counselling on patient behavior. It is obvious that patients who are well-informed make more sensible decisions concerning the usage of antibiotics. They are more likely to follow the recommended treatment plans, which lower the possibility of taking more antibiotics. This leads to improved patient outcomes as well as a decreased chance of AMR emergence, helping to maintain antibiotic effectiveness.

## CONCLUSIONS:

Antibiotic counseling is a crucial tool in the fight against antibiotic resistance. It empowers patients with knowledge, encourages responsible antibiotic use, and contributes to collective efforts to mitigate the antibiotic resistance. By improving patient understanding and adherence, it can transform the antibiotic use, leading to better treatment outcomes and preservation of antibiotic effectiveness. As part of the global effort to limit the irrational use, antibiotic counselling also assists patients in making requests for antibiotics only when medically necessary. It plays a crucial role in the comprehensive strategy to effectively combat AMR by promoting a culture of safe antibiotic use.

## REFERENCES:

1. Lesprit P, Landelle C, Girou E, Brun-Buisson C. Reassessment of intravenous antibiotic therapy using a reminder or direct counselling. Journal of antimicrobial chemotherapy. 2010 Apr 1;65(4):789-95.

2. Lesprit P, Landelle C, Brun-Buisson C. Unsolicited post-prescription antibiotic review in surgical and medical wards: factors associated with counselling and physicians' compliance. European journal of clinical microbiology & infectious diseases. 2013 Feb;32:227-35.

3. Bareth H, Sharma K, Kumar R. Impact of patient counselling on patient adherence with antibiotic drugs: an Indian survey. Pediatrics. 2019 Dec 28:36-53.

4. World Health Organization. Global action plan on antimicrobial resistance.

5. Mason T, Trochez C, Thomas R, Babar M, Hesso I, Kayyali R. Knowledge and awareness of the general public and perception of pharmacists about antibiotic resistance. BMC public health. 2018 Dec;18(1):1-0.

6. Dyar OJ, Zhang T, Peng Y, Sun M, Sun C, Yin J, Ding L, Sun C, Wang Y, Sun Q, Greko C. Knowledge, attitudes and practices relating to antibiotic use and antibiotic resistance among backyard pig farmers in rural Shandong province, China. Preventive veterinary medicine. 2020 Feb 1;175:104858.

7. Huttner BD, De Lastours V, Wassenberg M, Maharshak N, Mauris A, Galperine T, Zanichelli V, Kapel N, Bellanger A, Olearo F, Duval X. A 5-day course of oral antibiotics followed by faecal transplantation to eradicate carriage of multidrug-resistant

Enterobacteriaceae: a randomized clinical trial. Clinical microbiology and infection. 2019 Jul 1;25(7):830-8.

8.  Grill E, Weber A, Lohmann S, Vetter- Kerkhoff C, Strobl R, Jauch KW. Effects of pharmaceutical counselling on antimicrobial use in surgical wards: intervention study with historical control group. Pharmacoepidemiology and drug safety. 2011 Jul;20(7):739-46.

9.  Markose F, Chacko J, Thampy NS. IMPACT OF PATIENT COUNSELLING BY CLINICAL PHARMACIST IN IMPROVING KAP (KNOWLEDGE, ATTITUDE AND PRACTISE) OF CAREGIVERS OF PAEDIATRIC POPULATION REGARDING ANTIBIOTIC USE FOR RESPIRATORY TRACT INFECTION.

10. Northey A, McGuren T, Stupans I. Patients' antibiotic knowledge: a trial assessing the impact of verbal education. International Journal of Pharmacy Practice. 2015 Apr;23(2):158-60.

11. McNulty CA, Nichols T, Boyle PJ, Woodhead M, Davey P. The English antibiotic awareness campaigns: did they change the public's knowledge of and attitudes to antibiotic use?. Journal of Antimicrobial Chemotherapy. 2010 Jul 1;65(7):1526-33.

12. Gharbi M, Moore LS, Castro-Sánchez E, Spanoudaki E, Grady C, Holmes AH, Drumright LN. A needs assessment study for optimising prescribing practice in secondary care junior doctors: the Antibiotic Prescribing Education among Doctors (APED). BMC Infectious Diseases. 2016 Dec;16:1-0.

13. Smith CR, Pogany L, Foley S, Wu J, Timmerman K, Gale-Rowe M, Demers A. Canadian physicians' knowledge and counseling practices related to antibiotic use and antimicrobial resistance: two-cycle national survey. Canadian Family Physician. 2017 Dec 1;63(12):e526-35.

14. Uchil RR, Kohli GS, KateKhaye VM, Swami OC. Strategies to combat antimicrobial resistance. Journal of clinical and diagnostic research: JCDR. 2014 Jul;8(7):ME01.