



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**KNOWLEDGE OF ANTIBIOTICS AMONG MOTHERS OF CHILDREN
UNDER FIVE WITH LOWER RESPIRATORY TRACT INFECTIONS: A
CLINICAL PHARMACISTS' INTERVENTION**

**MALINI S^{*1}, JOSHUA JM², SCARIA GT³, JOSEPH J³, KRISHNAN P³,
RAJU S³, KOSHY SM⁴ AND MATHEWS SM⁵**

1: Professor & HOD, Department Of Pharmacy Practice, Pushpagiri College Of Pharmacy, Tiruvalla

2: Assistant Professor, Department Of Pharmacy Practice, Pushpagiri College Of Pharmacy, Tiruvalla

3: Fifth year Pharm. D., Department Of Pharmacy Practice, Pushpagiri College Of Pharmacy, Tiruvalla

4: Senior Consultant, Department Of Paediatrics, Pushpagiri Medical College Hospital, Tiruvalla

5: Principal, Pushpagiri College of Pharmacy, Tiruvalla

***Corresponding Author: Dr. Malini S: E Mail: maliniani1505@gmail.com**

Received 16th Jan. 2024; Revised 20th Feb. 2024; Accepted 24th July 2024; Available online 1st May 2025

<https://doi.org/10.31032/IJBPAS/2025/14.5.9018>

ABSTRACT

Background: Acute respiratory tract infections are responsible for increased morbidity and mortality rates among children. Antibiotics play an important role in the management of infections. Improper antibiotic use is a significant community health issue that contributes to antibiotic resistance. Insufficient mothers' knowledge about the cautious antibiotics use in treating infections can end in its misuse. Therefore the present study aims to evaluate the impact of clinical pharmacists' intervention on knowledge of antibiotics among mothers of children under five with Lower Respiratory Tract Infections (LRTI).

Methods: A prospective study was conducted in the Department of Paediatrics (OPD), at Pushpagiri Medical College Hospital, Thiruvalla. The study was carried out in 115 mothers for a period of six months. The study population included Mothers of Children under 5 years of age with diagnosis of Lower Respiratory Tract Infections(LRTI) prescribed with antibiotics and who satisfied inclusion and exclusion criteria.

Results: A total of 115 mothers participated in the study. 39 mothers (33.92%) had good knowledge on antibiotics at baseline which increased to 89 (77.39%) after an educational intervention. Prior to intervention, only 24.34% of mothers had satisfactory attitude and 89.57% mothers had subjective practice regarding antibiotic use among children, increasing to 82.6% attitude and 100% practice after intervention.

Conclusion: The study findings suggested that the health education session about appropriate antibiotic use have a major impact in improving the mothers' level of awareness, practice and changing attitude about proper use of antibiotic for their children.

Keywords: Knowledge, Attitude, Practice, Antibiotics, Lower Respiratory Tract Infection

INTRODUCTION

Respiratory tract infections (RTIs) are a focus of public health development due to their widespread prevalence and high morbidity and mortality reported worldwide [1]. The respiratory system is divided into upper and lower tracts: the upper respiratory tract includes the sinuses, middle ear, pharynx, epiglottis and larynx, while the lower respiratory tract includes the structures below the larynx, the bronchi, bronchioles and alveoli [2]. Respiratory tract infections are defined as any infectious diseases of the upper or lower respiratory tracts [3]. URIs affect the mucous membranes lining the upper respiratory tract, which includes the paranasal sinuses, middle ear, and vocal cords from the nostrils, mouth, and larynx [4]. According to the International Statistical Classification of Diseases [5], a URI can occur as acute nasopharyngitis (AN), acute sinusitis (AS), acute pharyngitis (AP), acute tonsillitis (AT), acute laryngitis (AL), and laryngotracheitis or laryngotracheobronchitis (LTB) [2]. Lower

respiratory tract infections (LRTI) are a leading cause of morbidity and mortality worldwide, and their burden disproportionately affects children [6]. LRTIs are acute infectious diseases involving the bronchi, bronchioles, alveoli and lungs. The term LRTI is a broad definition that refers to several infectious inflammatory diseases of the lower respiratory tract [1]. Acute lower respiratory tract infections are the leading cause of death in children below 5 years of age. These include croup syndromes, bronchitis, bronchiolitis and pneumonia [7]. Globally, LRTI cause 704,000 deaths, and the highest under-five LRTI mortalities were in developing countries [7]. To select rational antimicrobial therapy for a given infection, a variety of factors must be considered, including the severity and acuity of the disease, host factors, factors related to the drugs used, and the necessity for use of multiple agents [8]. Antibiotic resistance is a public health threat of the utmost importance,

especially when it comes to children: Antibiotic resistance occurs through selective adaptation of a bacteria to the compounds due to sub-lethal exposure to them. The result of this process is that the bacteria no longer responds to antibiotics that normally kill or inhibit the growth of them. According to WHO data, infections caused by multidrug resistant bacteria produce 700,000 deaths across all ages, of which around 200,000 are newborns. This surging issue has multipronged roots that are specific to the paediatric age. For instance, the problematic overuse and misuse of antibiotics (for wrong diagnoses and indications, or at wrong dosage) is also fuelled by the lack of paediatric-specific data and trials. The improper use of antibiotics is the most important cause of the modern expansion of antibiotic resistance. The roots of improper antibiotic use are the poor knowledge of pathogens associated with different infections, and of pharmacokinetic and pharmacodynamic characteristics of the specific antibiotic classes. These features highly influence and affect drug choice, correct doses, posology and duration of a treatment course [9]. Educational interventions have revealed to be valuable in increasing the awareness and changing beliefs and attitudes of the general public about

several community health concerns including antibiotic resistance emphasized on the major gaps in antibiotic awareness and practices, which are in turn supporting the growing hazards of antibiotic resistance. Lack of mothers' education, knowledge and no proper performance in the sense of antibiotics resistance has created disorders in the current health situation. The findings of the study would be very useful to inform health policy makers in determining a strategy or an intervention to promote appropriate antibiotic use in children with LRTIs. Moreover, the findings of the study will provide key message for health care practitioners to know which characteristics of the parents need to pay attention for providing sufficient and precise information related to antibiotic use [10].

MATERIALS AND METHODS

The study design was single centered, hospital based, prospective (observational) study. The proposed study was conducted in department of paediatrics OPD, in Pushpagiri Medical College Hospital, Thiruvalla for a period of 6 months. The study population included Mothers of children under five with complaints of LRTI and on antibiotic treatment visited the Department of Paediatrics (OPD) and who satisfied inclusion and exclusion criteria. Inclusion criteria were: Mothers of Children under 5 years of age with

diagnosis of Lower Respiratory Tract Infections(LRTI) prescribed with antibiotics. Mothers of children above five years, mothers who are not willing to give consent and mothers who lost to follow up were excluded from the study. Assuming 95% confidence interval and 9% absolute precision sample size was calculated by using the following Cochran's formula formula:

$$n=(Z\alpha/2)^2 \times pq /d^2$$

Sample size(n) was found to be 115.

Data collection tools includes data collection proforma, structured KAP Questionnaire and medication adherence questionnaire.

BRIEF STUDY PROCEDURE

A prospective observational study on 'Knowledge of antibiotics among mothers of children under five with lower respiratory tract infections: A Clinical Pharmacists' Intervention' was conducted at Pushpagiri Medical College Hospital, Thiruvalla. The study was conducted after getting approval from the Institutional Ethics Committee. The selection of patients was based upon the inclusion and exclusion criteria. All mothers were provided a brief introduction regarding the study and confidentiality of data. A written informed consent was obtained from the mother. A well designed data collection form was used to collect the necessary information such as demographic details of the patient,

diagnosis and treatment of the patient. KAP questionnaire was prepared which was used to collect the socio-demographic details of the mother, knowledge, attitude and practice regarding antibiotic use among these mothers. Medication adherence among children was assessed using medication adherence questionnaire. The data were collected twice, once after diagnosis and other during the follow-up which are considered as pre-test and post test data respectively. Pre-test and Post-test scores were compared and analysed. Prescribing pattern of antibiotics in children under five with LRTI were also assessed.

STATISTICAL ANALYSIS: The information recorded on the data collection forms were uploaded in an excel sheet and data was analysed using IBM SPSS version 20. Wilcoxon Signed Rank test was used to test if there is any significant difference between pre- test and post- test values. To obtain the association between categorical variables, chi square test was applied. A P value of < 0.05 is considered as statistically significant.

RESULT AND DISCUSSION

The present study aimed to assess the effect of educational intervention on mothers' knowledge, practice and attitude about appropriate antibiotic use for their children.

1. KNOWLEDGE OF ANTIBIOTICS AMONG MOTHERS

From this study it was found that, initially 39 (33.92%) mothers had good knowledge and this was improved to 89 (77.39%) after the clinical pharmacist intervention with a highly statistically significant difference ($p = 0.000$) (**Table 1, Figure 1**). These findings are consistent with Shehadeh, Suaifan & Hammad, (2016) conducted on Jordan that reported that overall knowledge about appropriate antibiotic use, improved after the intervention [11].

2. ATTITUDE OF MOTHERS TOWARDS ANTIBIOTICS USE

Only 28 (24.34%) of mothers had satisfactory attitude about appropriate antibiotic use among children before the intervention that increased the majority to 95 (82.6%) after intervention, during follow up with a highly statistically significant difference ($p=0.000$) between the attitude score of the mothers (**Table 2, Figure 2**). The present

study finding was in the same line with Taylor, Kwan-Gett & McMahon (2019) regarding the effectiveness of educational materials in improving the attitudes of parents of young children and about the judicious use of antibiotics. They reported that overall attitude score of mothers were unsatisfactory before the educational program and there was improvement of attitude score than before intervention [11].

3. PRACTICE LEVEL OF USING ANTIBIOTICS AMONG MOTHERS

As to subjective practice level of the mothers, 103 (89.57%) of mothers had satisfactory subjective practice about appropriate antibiotic use among children during pre-test which increased to the majority 115 (100%) after intervention in the follow up. There was a highly statistically significant difference ($p=0.000$) amongst the mothers (**Table 3, Figure 3**). This study finding is consistent with Kandeel *et al.*, (2019) who promoted appropriate antibiotic use for acute respiratory infections in a district in Egypt and concluded that improved practice level after educational session, and

they reported reduction of unnecessary use of antibiotic [11].

4. MEDICATION ADHERENCE IN CHILDREN

Initially 3 children (2.61%) had high adherence which was improved to 105 (91.3%) after the clinical pharmacist intervention with a highly statistically significant difference ($p=0.000$) (Table 7, Figure 7). A study on parental beliefs about medications and medication adherence among urban children with asthma carried out by Conn Km, *et al.* (2005) revealed that 75% of parents strongly believed that their child's medications were necessary for their health and 34% had strong concerns about the medications. Only 22% of parents reported being completely adherent with medications [12].

5. PRESCRIBING PATTERN OF ANTIBIOTICS

115 children with LRTI were included in this study, all the children were prescribed with antibiotics in which 113 children received single antibiotic and 2 received two antibiotics respectively. Amoxicillin Clavulanic acid 51 (44.3%), were the most commonly prescribed single antibiotic (Table 8, Figure 8). Antibiotics from the penicillin group (Amoxicillin/Clavulanic acid, Amoxicillin) were the most commonly prescribed in this study followed by drugs from the macrolide (Azithromycin) and cephalosporin class (cefepodoxime proxetil, cefixime). The study was consistent with Sadoh *et al.*, in which amoxicillin-clavulanic acid combination was most prescribed drug for respiratory tract infection [13].

Table 1: Knowledge of antibiotics among mothers

KNOWLEDGE	PRE- TEST (n=115)	PRE-TEST(%)	POST-TEST (n=115)	POST-TEST(%)	P-VALUE
Good	39	33.92	89	77.39	0.000
Moderate	41	35.65	25	21.74	
Poor	35	30.43	1	0.87	

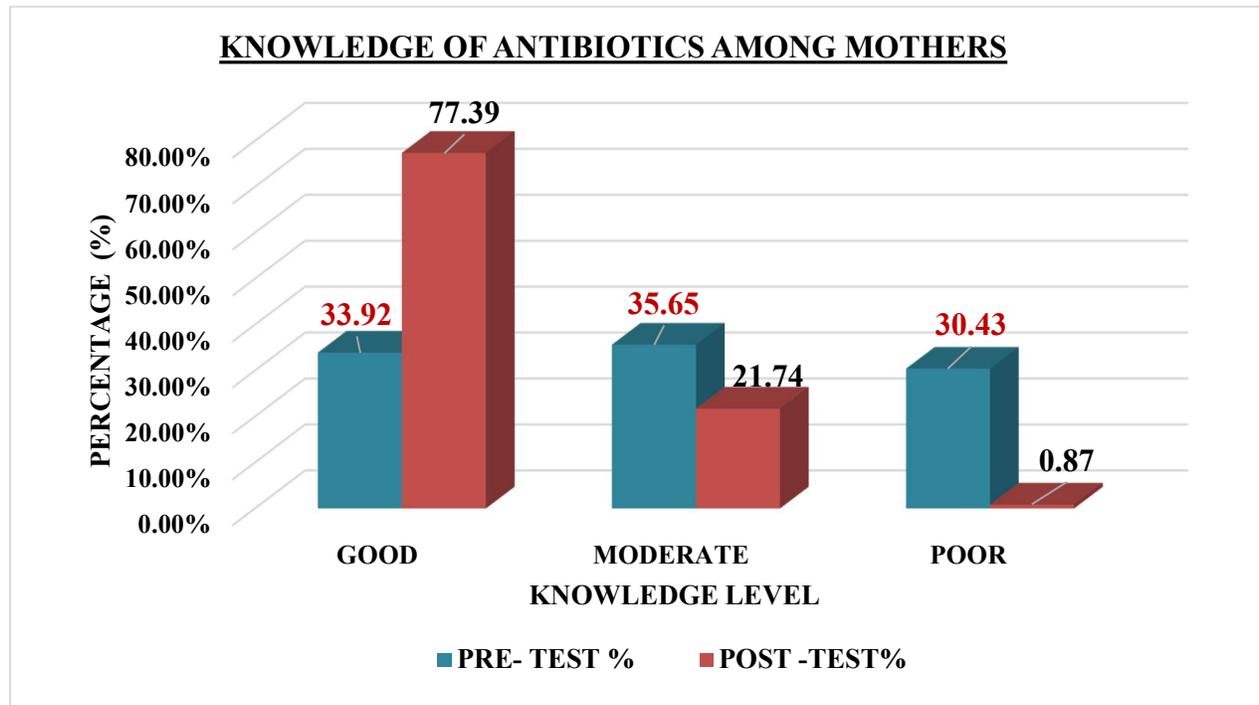


Figure 1: Knowledge of antibiotics among mothers

Table 2 : Attitude of mothers towards the use of mothers

ATTITUDE	PRE-TEST (n=115)	PRE-TEST (%)	POST-TEST (n=115)	POST-TEST (%)	P-VALUE
High	28	24.34	95	82.61	0.000
Moderate	78	67.82	20	17.39	
Low	7	6.08	0	0	

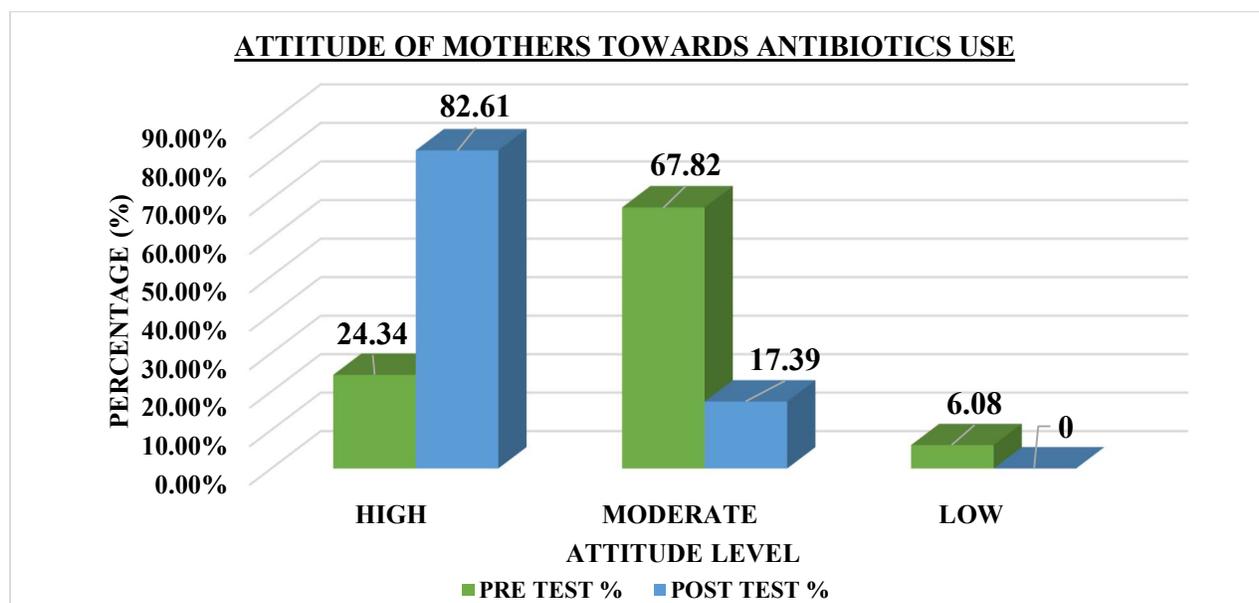


Figure 2: Attitude of mothers towards antibiotics use

Table 3: Practice level of Antibiotics use among mothers

PRACTICE	PRE- TEST (n=115)	PRE-TEST (%)	POST- TEST (n=115)	POST-TEST (%)	P-VALUE
High	103	89.57	115	100	0.000
Moderate	10	8.69	0	0	
Low	2	1.74	0	0	

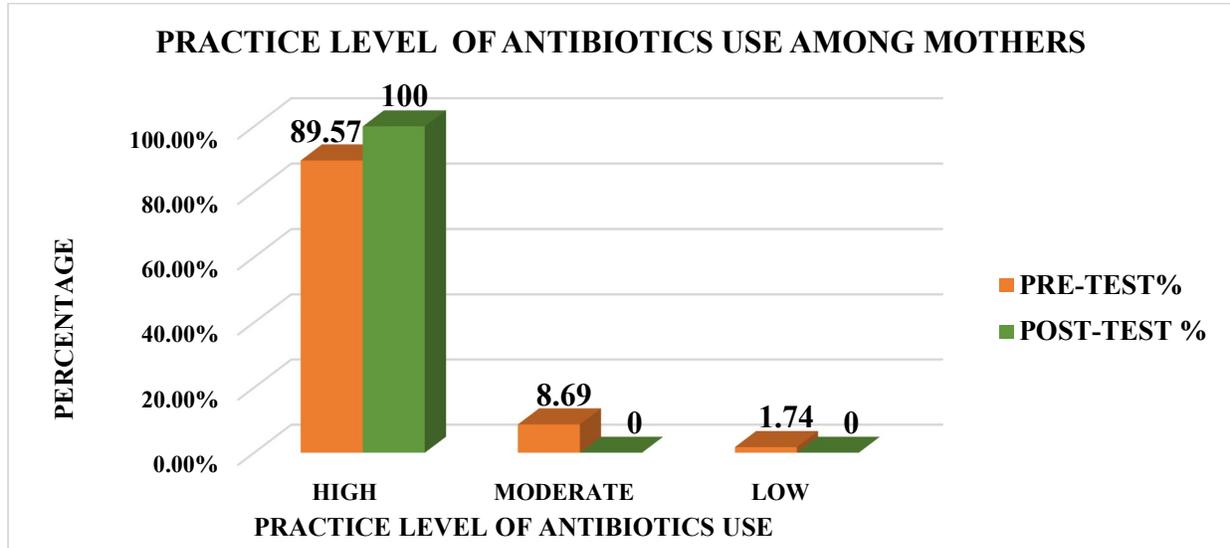


Figure 3: Practice Level of Antibiotics use among Mothers

Table 4: Medication adherence in children

MEDICATION ADHERENCE	PRE-TEST (n=115)	PRE-TEST (%)	POST-TEST (n=115)	POST-TEST (%)	P-VALUE
High	3	2.61	105	91.3	0.000
Medium	63	54.78	10	8.69	
Low	49	42.61	0	0	

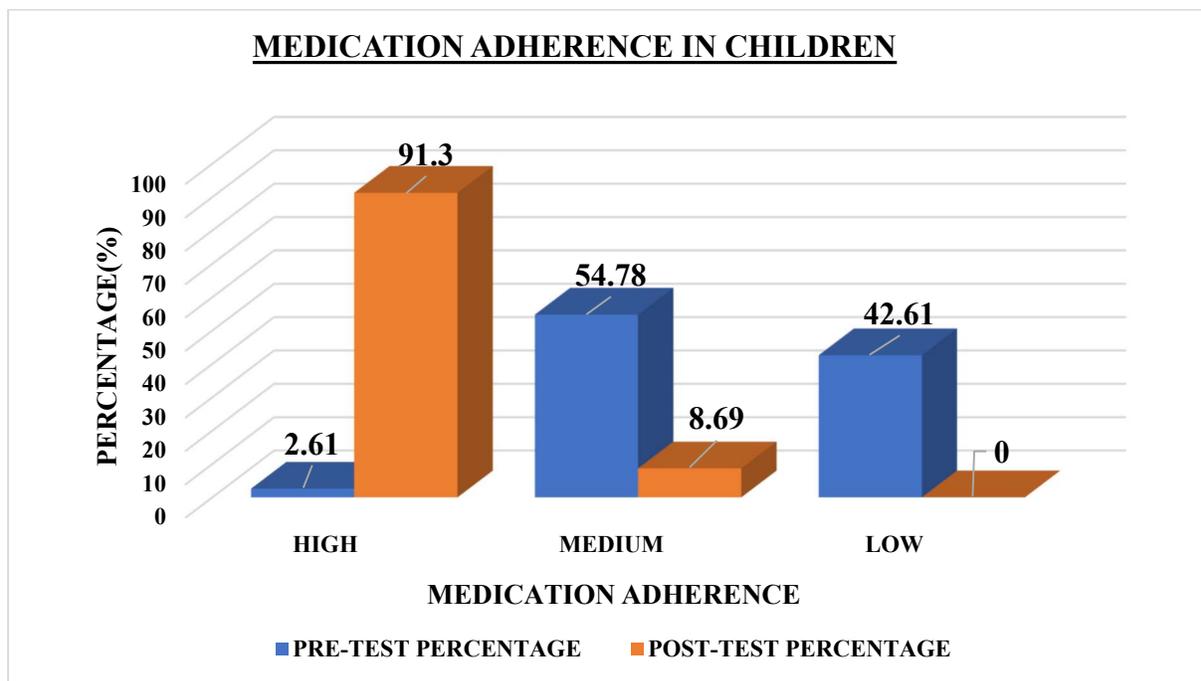


Figure 4 : Medication adherence in children

Table 5: Prescribing pattern of Antibiotics

ANTIBIOTICS	FREQUENCY	PERCENTAGE(%)
Azithromycin	23	20
Azithromycin +Cefpodoxime Proxetil	1	0.90
Azithromycin+ Amoxicillin Clavulanic acid	1	0.90
Cefpodoxime Proxetil	5	4.30
Amoxicillin	31	27
Amoxicillin Clavulanic acid	51	44.30
Cefixime	3	2.60

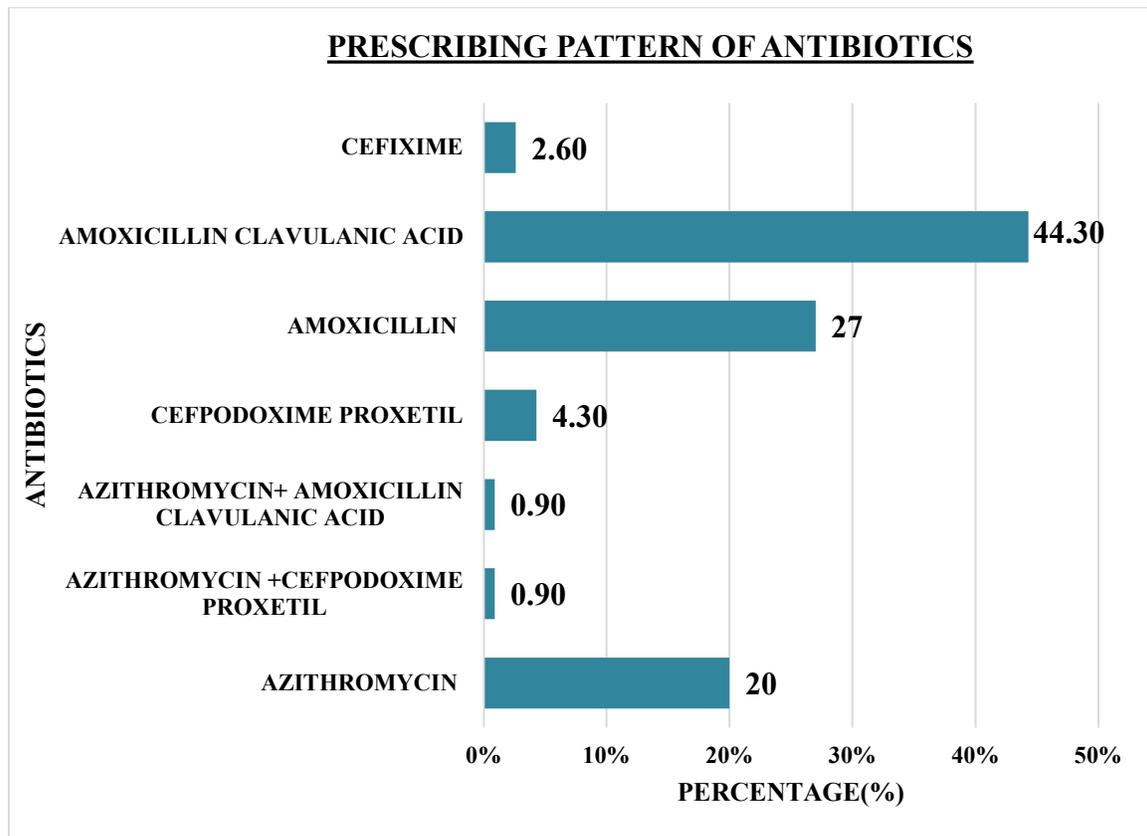


Figure 5: Prescribing Pattern of Antibiotics

CONCLUSION

Infants and children are the most vulnerable population that contract illnesses. Lower Respiratory Tract Infection (LRTI) is largest cause of morbidity among children under five across the world. The study highlighted the uncertainties among mothers regarding the proper use of antibiotics, particularly in pediatric cases. Factors such as lack of

knowledge, attitude, and easy availability of antibiotics were identified as contributors to misuse. Socio-demographic factors also influenced maternal awareness of antibiotics and antimicrobial resistance. Inappropriate antibiotic use not only increases resistance but also burdens the healthcare system financially. Parental counseling, intervention programs, and public health education are

deemed essential. Mothers with lower education levels showed less understanding, while those in medical professions had better perspectives. Self-medication with antibiotics was prevalent, often without prescriptions. Misconceptions about when antibiotics are necessary, confusion between bacterial and viral infections, and a lack of awareness about the limitations of antibiotics were common. Prescribing practices influence patient care; analyzing and improving prescribing patterns can enhance rational and cost-effective management. Hospitals should implement mechanisms to control antibiotic use. Non-compliance with short-term antibiotic therapy for respiratory infections is common but can be improved with appropriate interventions, leading to better adherence and outcomes.

ACKNOWLEDGEMENT

Authors would like to thank the research guide Dr. Malini S, Associate Professor, Department of Pharmacy Practise, Pushpagiri College of Pharmacy, Thiruvalla for her valuable support, encouragement and supervision. We also express whole hearted gratitude to co-guide Mrs. Julie Mariam Joshua, Assistant Professor, Department of Pharmacy Practice, Dr. Shanty Mary Koshy, Senior Consultant, Dept of Pediatrics, Pushpagiri Medical College Hospital, Thiruvalla and also thanks to Prof. Dr.

Santhosh. M Mathews, Principal at Pushpagiri College of Pharmacy, Thiruvalla.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/ publication of this article.

Funding

The authors received no financial support for the research, authorship and/ publication of this article.

Ethical Consideration

Institutional Research/ Human Ethics Committee approval was obtained with IEC no:

- PCP/IEC-02B/19/PD-2022
- PCP/IEC-02B/20/PD-2022
- PCP/IEC-02B/21/PD-2022
- PCP/IEC-02B/22/PD-2022

REFERENCE

- [1] Calderaro A, Buttrini M, Farina B, et al. Respiratory Tract Infections and Laboratory Diagnostic Methods: A Review with A Focus on Syndromic Panel Based Assays. *Microorganisms*. 2022 ;10(9):1856.
- [2] Walker R, Whittlesea C. Respiratory infections. In: *Clinical Pharmacy and therapeutics*. Philadelphia: Churchill Livingstone Elsevier; 2009;(5):545–560.

- [3] Tan T, Little P, Stokes T. Antibiotic prescribing for self-limiting respiratory tract infections in primary care: Summary of nice guidance. *BMJ*. 2008;337.
- [4] Eric A. F. Simoes, Thomas Cherian, Jeffrey Chow, et al. Acute Respiratory Infections in Children. In: *The International Bank for Reconstruction and Development/The World Bank: Washington, DC, USA, 2006;(2):483–98*.
- [5] Bramer GR. International statistical classification of diseases and related health problems. Tenth revision. *World health statistics quarterly*. 1988 ;41(1):32-36.
- [6] Tsitsiklis A, Osborne CM, Kamm J, et al. Lower respiratory tract infections in children requiring mechanical ventilation: a multicentre prospective surveillance study incorporating airway metagenomics. *The Lancet Microbe*. 2022 ;3(4):284-93.
- [7] Ghai OP, Piyush Gupta, Paul VK. Disorders of the respiratory system. In: *Ghai Essential Pediatrics, New Delhi, 2013;(8):372-395*.
- [8] Wells BG, DiPiro JT, Schwinghammer TL, et al. *Pharmacotherapy handbook*. McGraw-Hill Companies, Inc.; 2009:333.
- [9] Zyoud SE, Abu Taha A, Araj KF et al. Parental knowledge, attitudes and practices regarding antibiotic use for acute upper respiratory tract infections in children: a cross-sectional study in Palestine. *BMC pediatrics*. 2015;15(1):1-9.
- [10] Kim S, Prasopkittikun T, Payakkaraung S. Parents' Knowledge, Attitudes, and Practices towards Antibiotic Use in Children with Upper Respiratory Tract Infections in Cambodia. *Nursing Science Journal of Thailand*. 2021;39(4):83-96.
- [11] Abd El-kader RG, Mohammed HH. Effect of an educational intervention on mothers' knowledge, attitude and practice about proper antibiotic use in a selected family health center. *The Malaysian Journal Of Nursing (MJN)*. 2021;12(3):16-23.
- [12] Yosmar R, Fitria A, Yuliandra Y, et al. Evaluation Of Parents' Adherence In Giving Antibiotics On Respiratory Tract Infections (RTI) And Factors Associated With Adherence. *Research Journal Of Pharmaceutical*

- Biological And Chemical Sciences.
2016;7(1):1662-1665.
- [13] Soleimani G, Shahri ES, Teimouri A,
et al. Knowledge and behavior of
mothers about antibiotic use in
children under six years old with
upper respiratory tract infections.
International Journal of Infection.
2016 ;3(4).