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### An Assessment of Factors Affecting Antibiotic Prescription in Pediatric Department of Rural Tertiary Care Teaching Hospital, Wardha District, Maharashtra

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#### ABSTRACT

Antibiotics are among the most commonly prescribed drug in pediatric department. Overuse of antibiotics in children can cause serious effects on public health. This study was conducted to explore the use of antibiotics among children and identify the factors affecting antibiotic prescription, which is a cross sectional study, done in the outpatient pediatric department of Acharya Vinoba Bhave Rural Hospital from February to march 2012, 446 prescriptions were analyzed. Antibiotics were prescribed for 61.61% of those suffering from Upper respiratory tract infection and 72.26% of those with acute gastroenteritis. Regarding the instructions given to patients, found that it was more for duration of treatment (76.90%), the perception was the highest for knowing that only the physicians should prescribe it (83.41%). Presence or absence of fever (and parents perception were risk factors for prescription i.e. higher for parents having unsatisfactory antibiotic perception i.e. 70.45% and in cases of presence of fever i.e. 57.87 %. Residents were found to prescribe antibiotics more oftenly than Specialist i.e.94.45%, which constitute the most important factor affecting antibiotic prescription. This study leads to a conclusion that parents had unsatisfactory perception towards antibiotic's utilization. The use of antibiotics was determined by physicians' experience and mothers' educational level and her work status.

**Keywords:** Antibiotics, Pediatric department, Cross-sectional study, Prescription

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## INTRODUCTION

The worldwide emergence of antimicrobial resistance is a major public health problem that significantly impacts patient treatment and outcomes. The relationship between antimicrobial use and antimicrobial resistance is complex, with a growing body of data strongly suggesting that higher levels of antimicrobial usage are associated with increased levels of antimicrobial resistance [1, 2].

With the increase in antimicrobial prescriptions, prescribing errors have also become more common. These include treatments of colonization, suboptimal empiric therapy, inappropriate combination therapy, dosing, as well as duration errors and mismanagement of apparent antibiotic failures. Studies have shown an inappropriate prescribing of antimicrobials for prophylaxis as well as treatment [3-6]. Acute respiratory infection (ARI), acute watery diarrhea (ADD) and viral fever are the common childhood illnesses accounting for the major proportion of pediatric outpatient visits. Only a small proportion of these patients (<20%) require antibiotic therapy [7]. Studies have shown that there is an inappropriate use of antibiotics, especially the broad-spectrum antibiotics, for these common childhood illnesses, which has contributed largely to the Development of antibiotic resistance. One study in Brazil showed that 28% of the antibiotic prescriptions for children with ARI were inappropriate [8]. Another study showed that the use of broad-spectrum antibiotics has increased from 10.6% to 40.6% for bronchitis in a span of 6 years [9].

With an ever-increasing number of antibiotics becoming available to treat bacterial infections, health workers must be careful to choose the most appropriate drug for each infection. They also need to consider specific health risks, such as an allergy to the antibiotic, and whether the patient is able to follow the complete treatment requirements [10, 11]. Sweeteners, dyes, flavorings, and other unnamed additives are found in antibiotics prescribed to children. Even tiny amounts of the chemical additives in antibiotics can cause an allergic reaction for a sensitive child [12].

Inadequate consideration of the potential antimicrobial resistance, tissue penetration, drug interactions, side effects, and cost are among the factors which influence the prescription pattern and effectiveness of antimicrobial therapy [13]. At the level of the physician, perceived pressures to prescribe antibiotics include time pressures, the desire of children to return to school and child care quicker, and parental pressure [14-17].

It is very important to know the pattern of use of antibiotics. Therefore, this study was carried out to explore the pattern of use of antibiotics among children and identify the parents' influence on the physician's prescription.

## MATERIAL AND METHODS

A cross sectional study was conducted in the outpatient pediatrics department of Acharya Vinoba Bhave Rural Hospital starting from February through March 2012. Children with

mild to moderate morbid conditions (mainly gastroenteritis and respiratory tract infection) attending outpatient clinic were included. The total numbers of included prescriptions were 446. Inclusion of few cases with mild to moderate bronchial asthma, bronchitis, febrile convulsions and urinary tract infection was done. The diagnosis was based on the physicians' experience and examination of the individual cases.

A specially designed format consisting of data about socio-demographic characters, diagnosis, and treatment given (stressing on antibiotic prescription) of every included case. The parents were interviewed at the end of consultation and it included data about the parent's socio-demographic data as educational level (where primary and high school levels were considered as basic education and secondary and university level as high education). Work status (as working or not working) was also included. The parent's opinion regarding antibiotic prescription, its impact on the course of illness and the parent's influential role in antibiotics prescription were also asked for.

The purposes and the benefits of the study were explained to the parent's and a verbal consent was obtained. The study also include whether any instructions given by the physicians to whom antibiotics were prescribed about the proper antibiotic use, the parent's perception regarding antibiotic use and parent's satisfaction with their physician's visit.

All the data were collected, recorded, tabulated and analysed with respect to the objectives of the study. The data was subjected to descriptive analysis using Microsoft Excel.

## RESULTS

Among the studied children's prescription 62.33% are of male patients. Majority of patients fall in age group 1-5 years i.e. 41.70%. The majority of their fathers got high education i.e. 81.16%, however, 1.12% is not currently working. In cases of mother, where 78.03% got high education and 67.71% were housewives (**Table 1**).

Nearly two thirds (61.61%) of the cases presented with URTI were prescribed antibiotics, Less than three fourth (72.26%) of the cases presented with AGE were prescribed AB, and it was 48.24% for other presenting conditions as bronchial asthma, febrile convulsions (**Table 2**)

Regarding the instructions given to patients (on their prescriptions) under study, it was found that it was more for duration (76.90%), dose (74.89%), concentration (67.94%) and the least for stating the possible side effects (14.35%).(**Table 3**)

The perception was the highest for knowing that only the physicians should prescribe it (83.41%), antibiotic effect either its cure rate (72.87%) or its benefits in all disease conditions (69.50%). The minimum was for its eligible duration of use (19.51%) and perception of possible drawbacks (23.10%).

**TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERS OF THE STUDIED CHILDREN**

S.N.	Parameter		Number Total=446(N)	Percentage (%)
1.	Sex	Male	278	62.33
		Female	168	37.67
2.	Age	>1 year	101	22.65
		1-5 year	186	41.70
		5-14 year	159	35.65
3.	Father's Education	Illiterate	11	2.47
		Basic*	73	16.37
		High**	362	81.16
4.	Mother's Education	Illiterate	17	3.81
		Basic	81	18.16
		High	348	78.03
5.	Father's Work Status	Working	441	98.88
		Non-Working	05	1.12
6.	Mother's Work Status	Working	144	32.29
		Non-Working	302	67.71

\* Basic Education – Primary and High School Level

\*\* High Education – Higher Secondary and University Level

**TABLE 2: DISTRIBUTION OF CHILDREN ACCORDING TO PRESENTING DISEASE STATUS AND ANTIBIOTIC PRESCRIPTION**

S.N.	Disease	Total Cases	Antibiotic Prescribed	N	%
1.	Upper respiratory tract infection	224	Yes	138	61.61
			No	86	38.39
2.	Acute gastro enteritis	137	Yes	99	72.26
			No	38	27.74
3.	Others ( bronchial asthma, febrile convulsions, urinary tract infection and bronchitis etc.)	85	Yes	41	48.24
			No	44	51.7

**TABLE 3: INSTRUCTIONS GIVEN BY PHYSICIAN**

Parameter		Resident(N=272) (Number and Percentage)	Specialist(N=174) (Number and Percentage)	Total (N=446) (Number and Percentage)
Concentration	Yes	182 (66.91)	121 (69.54)	303 (67.94)
	No	90 (33.09)	53 (30.46)	143 (32.06)
Dose	Yes	204 (75.00)	130 (74.71)	334 (74.89)
	No	68 (25.00)	44 (25.29)	112 (25.11)
Duration of treatment	Yes	201 (73.90)	142 (81.60)	343 (76.90)
	No	52 (19.12)	33 (18.97)	85 (19.06)
Possible side effects	Yes	25 (9.19)	39 (22.41)	64 (14.35)
	No	247 (90.81)	135 (77.59)	382 (85.65)
Next checkup	Yes	212 (77.94)	123 (70.69)	335 (75.11)
	No	60 (22.06)	51 (29.31)	111 (24.89)

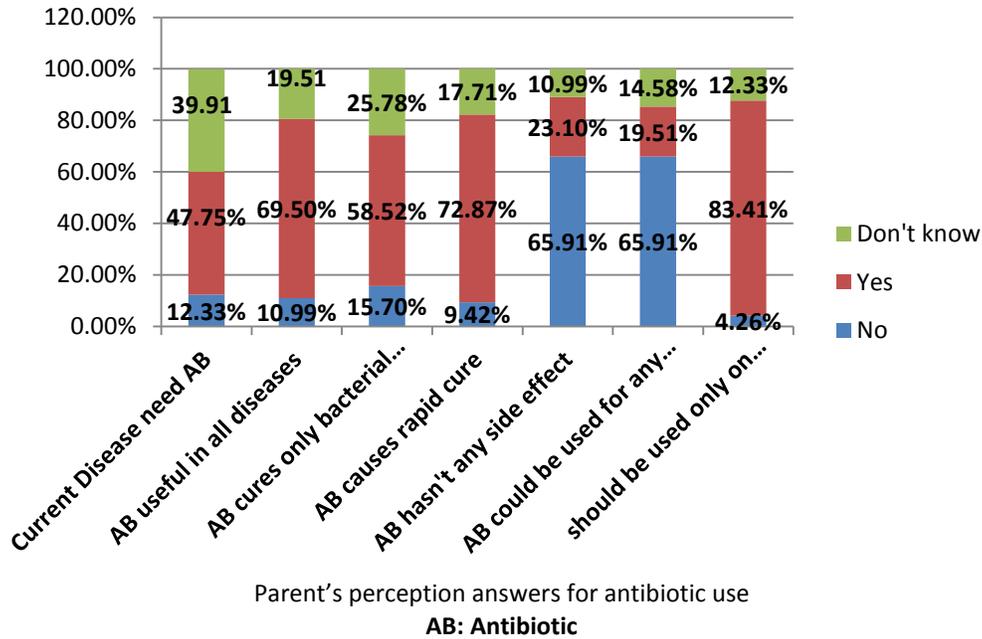


FIGURE 1: PARENT'S PERCEPTION ANSWERS FOR ANTIBIOTIC USE:

TABLE 4: FACTORS AFFECTING ANTIBIOTIC PRESCRIPTION.

S.N	Factors	Division according to cases total number (446)	AB Prescribed N & %	AB not Prescribed N & %
1.	Doctor's Qualification	Resident (272, 60.99%)	258 (94.85%)	14 (5.15%)
		Specialist (174, 39.01%)	106 (60.92%)	68 (39.08%)
2.	Fever	Presence of Fever (356, 79.82%)	206 (57.87%)	150 (42.13%)
		Absence of fever (90, 20.18%)	32 (35.56%)	58 (64.44%)
3.	Parent's AB Perception	Satisfactory (402, 90.13%)	203 (50.50%)	199 (49.50%)
		Unsatisfactory (44, 9.87%)	31 (70.45%)	13 (29.55%)
4.	Mother's Work Status	Working (144, 32.29%)	72 (50.00%)	72 (50.00%)
		Not Working (302, 67.71%)	163 (53.97%)	139 (46.03%)
5.	Mother's education	Educated (429, 96.19%)	209 (48.72%)	220 (51.28%)
		Illiterate (17, 3.81%)	11 (64.71%)	6 (35.29%)

Certain factors; both protective and risky ones, were affecting AB prescription. Protective factors included Doctor's qualification where rate of antibiotic prescription is higher among residents than specialist i.e. 94.85%, mother's education and work status where rate of

antibiotic prescription is higher among illiterate and nonworking mother i.e. 64.71% and 53.97% respectively. Risk factors included parent’s perception of AB use and the presence or absence of fever where rate of antibiotic prescription is higher for parents having unsatisfactory antibiotic perception i.e. 70.45% and in cases of presence of fever i.e. 57.87 %. (Table 4 & Figure 2)

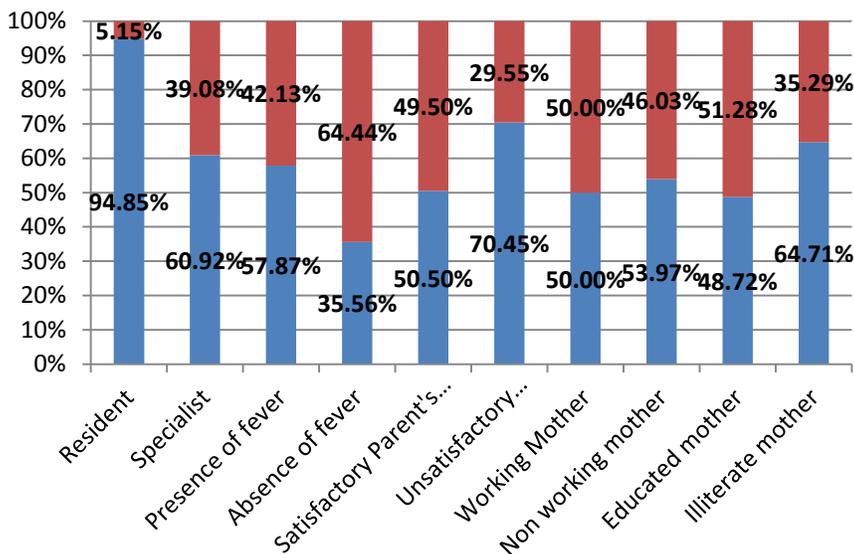


FIGURE 2: FACTORS AFFECTING ANTIBIOTIC PRESCRIPTION

### DISCUSSION

The emerging problem of antibiotic resistance has become a major threat to the medical field. Excessive and Inappropriate use of antibiotics has been a major contributor to this ever-growing problem. The misuse of antibiotics (i.e. inappropriate use of antibiotics which may include inappropriate type or generation, dose, concentration, route or duration) is a problem in many countries all over the world. Also, the overuse of antibiotics (i.e. the use of antibiotics when is not needed) is a great problem all over the world. Modern medical care often relies on antibiotics. Antibiotics are often prescribed for viral infections, such as colds, flu, herpes infections, and gastroenteritis, which do not require antibiotics. The current study revealed that 61.61% of cases presented with URTI and 72.26% of gastroenteritis cases were prescribed antibiotics. This result was associated with that of a research published at BMC Pediatrics journal that shows that pediatricians are more likely to inappropriately prescribe antibiotics for respiratory tract infections especially if they perceived parents who were expecting a prescription [18, 19].

This finding was also proved in this work where physicians; either residents or specialists were influenced by the parents’ expectations and desire for antibiotic prescription. Similarly one study proved that 56% of cases were prescribed antibiotics even when the diagnosis was uncertain [20]. However, antibiotics have no role to play in the treatment of viral infections.



Common misuses of antibiotics by physicians include: prescribing antibiotics when no bacterial infection exists, prescribing the wrong drug, or the wrong dose to treat an infection that does exist, prescribing antibiotics for longer than what is necessary, prescribing a strong antibiotic when a less strong one would be as effective, choosing an expensive drug when a cheaper but equally effective or slightly less effective one will be adequate [21].

In the present study, it was found that the presence of fever increased the likelihood of antibiotic being prescribed. This is largely due to the fact that the physicians tend to consider fever as a sign of bacterial infection, which is not the case always.

Some Researchers used a two-step survey to first investigate family and hospital pediatricians' knowledge and attitude towards antibiotics, as well as that of parent's, and then to determine the factors associated with pediatrician's actual practices of antibiotic prescription [18]. They found that for parents, the perception of the importance of the use of antibiotics was the most important factor potentially associated with over-prescription. But in our study perception of antibiotic use is second most common factor (70.45% in case of unsatisfactory parent's antibiotic perception) after Doctor's qualification (94.45% by residents)

It was proved that if patients do not follow the physician's instructions of antibiotic given, it will not produce the desired effect no matter what the effectiveness the drug is. The present study revealed that the overall instructions score given to parents whose children were prescribed antibiotics were, for duration 76.90%, dose 74.89%, concentration 67.94%, side effects 14.35%. This instruction score was much lower than that of a previous study that was done in USA in 2003; where it was nearly 80.0% [22].

Furthermore, some parents give an overdose to their children, in the false belief that by taking more of the drug they will get better faster. The importance of completing the full course of antibiotics and taking the correct dose at the stated times must be emphasized by the doctor prescribing the antibiotics [23].

For achieving the goal of rational use of medicines it is not sufficient to choose the right medicines only but also they must be employed in the most appropriate manner. There is an ample scope of improving the prescribing pattern by keeping the number of medicines as low as possible, using medicines appropriately after selecting and consciously keeping the cost of therapy low.

## CONCLUSION

The use of antibiotics was determined by the physician's experience and the mother's educational level and her work status. For achieving the goal of rational use of medicines it is not sufficient to choose the right medicines only but also they must be employed in the most appropriate manner. Antibiotic use for predominantly viral infections should be reduced, which can be reduced by the availability of rapid diagnostic method to differentiate between viral and bacterial infection. Most of the Parent's had unsatisfactory perception towards antibiotic's

utilization. Proper education program on rational usage of drug and an antimicrobial order form should be implemented in the hospitals to reduce the inappropriate therapy.

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