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# What is the Understanding of Antibiotics among Parents of Young Children? Findings of a Cross-sectional Study Conducted in a Tertiary Care Hospital in South India

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## ABSTRACT

**Introduction:** Antibiotics were considered the greatest invention in the 20th century. Antibiotic resistance is an alarming issue in developing countries and the major reason contributing to this is the irrational use because of the lack of knowledge.

**Aim:** To understand the level of knowledge and the usage pattern of Antibiotics among Parents of Young Children attending a Tertiary care Hospital

**Methodology:** The present study was a cross-sectional study conducted among the parents of children attending the Pediatric Out-patient department in a tertiary care hospital in Kancheepuram district, Tamil Nadu. A total of 133 participants were surveyed using a semi-structured and a pre-tested questionnaire to find out their understanding of Antibiotics.

**Results:** Among the 133 participants, around 23.4% of parents correctly identified antibiotics are used against bacterial infections, and only 16.6% of people knew about the term antibiotic resistance. About 60% of parents said that they never used leftover antibiotics. People with low socio-economic status were found to have a lack of knowledge regarding antibiotics and they misuse them without knowing the consequences.

**Conclusion:** We need to invest more time in educating and creating awareness regarding the judicial use of antibiotics and to check unprescribed dispensing of antibiotics.

**Key Words:** Antibiotic resistance, Attitude, Knowledge, Practice

## INTRODUCTION

Antibiotics were considered to be the greatest invention in the 20<sup>th</sup> century for treating bacterial infections.<sup>1</sup> However, rampant and irrational use of antibiotics for any clinical condition will emerge as a worldwide issue of antibiotic resistance in the future. The World Health Organization (WHO) defines antimicrobial resistance as a microorganism's resistance to an antimicrobial drug that was once able to treat an infection by that microorganism. Resistance arises as a consequence of mutations in microbes and selection pressure from antibiotic use that provides a competitive advantage for mutated strains.<sup>2</sup> A person cannot become resistant to antibiotics. Resistance is a property of the microbe, not a person or other organism infected by a microbe. WHO has warned about the excessive use of antibiotics, where minor infection

and injury won't be manageable with the help of antibiotics in the future.

There is increasing bacterial resistance due to improper management and weak implementation of Health policy.<sup>3</sup> The major cause of mortality in children in developing countries like India is Acute Respiratory Infections (ARI). Upper respiratory tract infections are the most common case where antibiotics are prescribed in the Pediatrics Age group.<sup>4</sup> There should be an awareness of the consequences of unnecessary prescription of antibiotics among Physicians, and the General public should also be conscious of this matter.<sup>5</sup> Viral infections are the most common (which do not require antibiotics) and bacterial infections carry less than 5% complicated problems, therefore, antibiotics should be used judiciously.

Knowledge of antibiotics is well known to be poor among

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the general public. As India is ranked the world's largest consumer of antibiotics for human health, the misuse of antibiotics is striking in India. The rules by the Drugs and Cosmetics Act stated only qualified medical practitioners can prescribe medicine, but it is not practised everywhere instead, without valid prescription the people who do not hold any formal degree and are not trained in allopathic medicine prescribe drugs and misuse it as part of their regular practice.<sup>6</sup> The rate of self-medication is found to be rising around the world including India.<sup>7</sup> Because of these factors, it is necessary to investigate and prevent these detrimental practices. Thus, the present study was undertaken to find out the current understanding of antibiotics.

## MATERIAL AND METHODS

**Study Design:** This is a Hospital-based cross-sectional study conducted among parents of children who attended the pediatric outpatient department (OPD) of a Tertiary Care Hospital in Kancheepuram district, Tamil Nadu.

**Ethical Clearance number:** SMC/IEC/2020/03/407

**Study period:** The study was conducted for 2 months between February and March 2020.

**Study Population:** We included the Parents of Children who attended the Pediatric OPD of a Tertiary care hospital during the above-mentioned study period. Children who were accompanied by guardians and grandparents were not included in our study. Parents who refused to participate were also excluded from the study.

**Sample size:** 133 willing parents of young children were included in our study.

**Study procedure:** Approval from the Institutional Health Research Ethics Committee was obtained before the commencement of the study. The interview was conducted in the OPD and this was done after the parents sought consultation from the doctors for their child. Before the interview began, verbal consent was obtained by informing them about the nature and purpose of the study. Face-to-face interaction with each participant was done to collect data. If both the parents of the child were present then whoever was willing among them was taken for the data collection. Counselling & Health education was given about the knowledge of Antibiotics and their resistance to the parents after the completion of the interview.

**Study tool:** The study tool consisted of the semi-structured pretested questionnaire which consisted of questions that were adopted from previous studies.<sup>8,9</sup> A pilot study was undertaken with 10 participants to test the validity and reliability of the data collection tool and to identify possible field problems and modifications were made accordingly.

The questionnaire consists of several sections: Socio-demographic characteristics; Knowledge; Attitude, and Practice.

**Data Analysis:** Data were entered in an Excel spreadsheet (Microsoft, Redmond, WA, USA). Data were analyzed using Statistical Package for Social Sciences version 20 (IBM, Armonk, NY, USA). Proportions were used to describe the socio-demographic variables and the Chi-square test was used to measure the association between the variables. p-values < 0.05 were considered statistically significant.

## RESULTS

A total of 133 participants participated in the interview. Out of the 133 participants, 68.4% were females and 31.6% were males. The majority (53%) of the participants were between the age group of 21-30 years and very few (4%) in the age group of 41-50 years. Education level was grouped as Illiterate, Primary school, High school, Intermediate/diploma, Graduate and then, Professional degree, of these 133 respondents, 3.7% were Professional degree holders, 21.8% were graduates. 1/3<sup>rd</sup> (33%) of parents were residing in a rural area and the remaining 67% were from an urban area. The majority (40%) of participants belonged to the lower-middle-class group in the Socioeconomic status classification. [Table:1].

Out of the total, nearly 1/4<sup>th</sup> (23.4%) of parents knew antibiotics were used against bacterial infections, while 27.8% of parents thought it is used against viral infections, and 42.8% thought it can be used in all conditions. The majority (78.2%) of Parents also preferred antibiotics whenever their child fell sick without knowing that it is used only against bacterial infections. Moreover, only 16.6% of parents knew about the term antibiotic resistance. Nearly 2/3<sup>rd</sup> of the parents (72%) felt that antibiotics do not cause any harm after excessive use. The majority (96%) of the participants said that they complete the course duration of antibiotics as prescribed by the doctor and 60% of the parents say they never used leftover antibiotics for their child from the previous prescription. 44.4% of the parents thought that the efficacy is better if the antibiotics were newer and costlier. The majority of the people didn't know about the adverse effects of antibiotic use but some people who knew said it causes diarrhoea (37%), and skin rashes (20%) respectively [Table 2].

Based on their responses to all the questions in this study, the respondents were classified into having good knowledge (>50% correct responses) and poor knowledge (<50% correct responses). We found that only about 23.6% of the parents had a good knowledge of antibiotics. While calculating chi-square to find out the association between knowledge of Antibiotics and study variables, we found a significant association (p<0.05) for residence (i.e., rural

or urban) and socioeconomic status with knowledge on antibiotics.

Concerning Socioeconomic status, the lower-middle and upper-middle-class had more knowledge than the other classes. Other variables like gender, age of the parents, and number of children in the family did not have statistical significance with antibiotics knowledge [Table:3]

## DISCUSSION

Knowledge of antibiotics and their resistance is known to be less, currently to the general public in India as well globally. Anyone of any age or country antibiotic resistance affects everyone. Though antibiotic resistance occurs naturally, it is the misuse of antibiotics in humans that is speeding this process.<sup>10</sup> But because of the relaxed laws in India and other developing countries, it is somewhat easy to obtain antibiotics without prescription (over-the-counter drugs), and hence, antibiotics misuse is common by people.<sup>11,12</sup> This study presents several observations concerning antibiotic use, levels of knowledge, and understanding of the problem of antibiotic resistance.

The results on the understanding of the respondents' knowledge clearly show a high level of misunderstanding. Only about 23 % of the participants had good knowledge of Antibiotics. Similar findings were reported in China where 39% of the parents had a good knowledge of Antibiotic use.<sup>13</sup> On the contrary, a study was done in Norway where more than half of the participants had good knowledge of Antibiotics.<sup>14</sup>

Also evident from this study is that only 23.4% of parents were aware that antibiotics are used against bacterial infections and are not effective against viruses. The majority 42.8% of parents thought that antibiotics could be used for any conditions and also thought that antibiotics were effective against viruses. Several studies also report similar findings.<sup>13-15</sup> A possible reason could be that while counseling, doctors use 'Germs' as a common word for indicating pathogens, rather than specifically mentioning bacteria. Also, as mentioned by Rousounidis et al. people don't have the knowledge to differentiate bacteria and viruses and hence, believe that antibiotics are effective against any infection.<sup>16</sup>

The lack of knowledge regarding antibiotic resistance was evident because only 16.6% of parents were aware of antibiotic resistance. The majority of the parents didn't know about antibiotic resistance but interestingly few of them know that excessive use of antibiotics may harm the child 28%. In contrast, a study done by Chinnaasami et al. showed respondents had more knowledge about resistance.<sup>17</sup> Parents with more than one child had some knowledge about antibiotic usage and the consequences of using it from their personal experience when they used to give it to their first child. 96% of

parents follow the duration of antibiotics as prescribed by the doctor in our study. Higher rates of compliance were also reported by Vanderberg et al. and Hoppe et al. in Germany with nearly 70 % compliance.<sup>18,19</sup> Similarly, Rasheena et al. showed that 64% of respondents followed doctors' advice.<sup>20</sup> In general, compliance was better whenever a single dose per day was advised as opposed to multiple doses in a day. Additionally, some antibiotic suspensions are flavoured with the essence which is more appealing to children during consumption. Knowledge of antibiotics and their resistance must be required for parents, otherwise, we may see an increase in community-acquired infections.<sup>21</sup>

## CONCLUSION

The present study found that the majority of parents lack knowledge of antibiotics use and its resistance. Without the proper knowledge, they misuse antibiotics with excessive use. We need to invest more time in educating and creating awareness regarding the judicious use of antibiotics and to check unprescribed dispensing of antibiotics. Strategies for effective communication among parents and physicians to ensure patients' knowledge about antibiotics and tell them its excessive use causes consequences and to advise to reduce self-medication practices with antibiotics.

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### Informed Consent

Proper Informed Consent was taken from all participants before initiation of the study and Confidentiality was maintained.

### Declaration of Competing Interest

The authors declare that there are no conflicts of interest.

### Contribution of the Authors

(1) Conception and design of the study, acquisition, and entry of data (2) analysis and interpretation of data, manuscript writing (3) Drafting the article, revising it critically for important intellectual content & Proofreading.

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**Table 1: Demographic characteristics of the participants**

Characteristic	Frequency (N=133)	Percentage (%)
<b>AGE GROUP IN YEARS</b>		
21-30	71	53%
31-40	56	42%
41-50	6	4%
<b>GENDER</b>		
Male	42	31.60%
Female	91	68.40%
<b>EDUCATION</b>		
Illiterate	5	3.70%
Primary school	4	3.20%
Middle school	14	10.50%
High school	35	26.30%
Intermediate/Diploma	41	30.80%

Characteristic	Frequency (N=133)	Percentage (%)
Graduate	29	21.80%
Professional degree	5	3.70%
RESIDENCE		
Rural	44	33%
Urban	89	67%
SOCIO-ECONOMIC STATUS		
Upper	7	5.30%
Upper middle	29	21.80%
Lower middle	53	40%
Upper lower	38	28.50%
Lower	6	4.40%

**Table 2: Participants Knowledge, Attitude and Practice about Antibiotics**

S. No.	STATEMENT	NUMBER=133	PERCENTAGE %	95% CI
<b>KNOWLEDGE</b>				
1	When are antibiotics used?			
	Viral infections	37	27.80%	24.37-31.23
	Bacterial infections	31	23.40%	19.97-26.83
	Fungal infections	8	6%	2.57-9.43
	Others	57	42.80%	39.37-46.23
2	Do you think antibiotics are required every time your child falls sick?			
	Yes	104	78.20%	69.2-87.2
	No	29	21.80%	12.8-30.8
3	Have you heard anything about antibiotic-resistant?			
	Yes	22	16.60%	11.28-21.92
	No	111	83.40%	78.08-88.72
4	Is it necessary that antibiotics should be prescribed by the doctor?			
	Yes	129	97%	94.71-99.32
	No	4	3%	1.67- 4.33
5.	Is the efficacy better if the antibiotics are newer and the price is higher?			
	Yes	59	44.40%	41.08-47.72
	No	74	55.60%	52.28-58.92
<b>ATTITUDE ON ANTIBIOTIC USAGE</b>				
1	Do you buy antibiotics over the counter at the pharmacy?			
	Yes	133	100%	96.68-103.32
	No	0	0	0
2	When the doctor prescribed an antibiotic for your child. After a few days, your child showed some reaction to it. What will you do next?			
	Go to the doctor immediately	100	75.20%	70.97-79.43
	Go to a pharmacy for another antibiotic	14	10.50%	6.27-14.73
	Stop the antibiotic without consulting	19	14.30%	10.07-18.53
3	Some antibiotics previously prescribed by the doctor for similar symptoms are leftover at home. Would you use it for your child at a later date without consulting a doctor?			
	Yes	40	30%	26.64-33.36
	No	93	70%	66.64-73.36

Table 2: (Continued)

S. No.	STATEMENT	NUMBER=133	PERCENTAGE %	95% CI
<b>PRACTICE ON ANTIBIOTIC USAGE</b>				
1	Do you check the expiry date before giving it to your child?			
	Yes	133	100%	96.68-103.32
	No	0	0	0
2	Do you follow the duration of the prescription given by the doctor?			
	Yes	128	96%	93.75-98.25
	No	5	4%	1.75-6.25

Table 3: Association between socioeconomic variable and knowledge about Antibiotic

		Knowledge of Antibiotics			Chi-square*	P-Value
		Poor	Good	Total		
Gender	Female	74	17	91	0.494	0.495
	Male	32	10	42		
Age of Parent	Up to 30	43	14	57	1.19	0.29
	>30	63	13	76		
Number of Children	Upto 2	90	22	112	0.19	0.663
	More than 2	16	5	21		
Residence	Rural	41	3	44	7.387	0.007**
	Urban	65	24	89		
Socio- economic status	Lower	6	0	6	40.3	<0.001**
	Lower middle	44	9	53		
	Upper lower	37	1	38		
	Upper middle	19	10	29		
	Upper	0	7	7		

\*Pearson's Chi-square \*\*Statistically significant