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Research Article

Knowledge, attitude and practice of parents towards antibiotic usage and its resistance

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ABSTRACT

Background: To assess the knowledge, attitude and practices about rational antibiotic usage and antibiotic resistance among parents attending a hospital based setting in Tamilnadu.
Methods: The study was a cross-sectional quantitative study in which four hundred and ninety one respondents, majority of them aged 20-50 years participated. A standard questionnaire comprising of questions related to antibiotics, its indications, resistance and doctor-patient relationship was given to them and their responses were recorded.
Results: Majority of participants were young and educated parents. Most of them were not aware of the indications of antibiotics with only 17% agreeing that antibiotics have no role against viruses. Also only 20% accepted that antibiotics are not necessary for short duration fever and common cold. Around 60% are of the opinion that full course of antibiotics should be completed and left over antibiotics should not be saved for later use. Participants with prior medical training had 18 times better knowledge about antibiotics as compared to general public. There was no significant association between antibiotic prescription patterns and trust over doctors.
Conclusions: Majority of participants' knowledge as well as attitude towards rational antibiotic usage is less and educational programs for public to combat antibiotic resistance should address both these issues. The high level of trust on doctors by parents should encourage physicians to be rational in their antibiotic prescriptions.

Keywords: Antibiotic resistance, Antibiotic prescribing, Pediatrics, Child health

INTRODUCTION

Alexander Fleming whose discovery of penicillin started the era of modern antibiotics also predicted that misuse of antibiotics could result in development of resistance.[1] At present antibiotic resistance especially multidrug resistance has become a worldwide problem. India has the highest antibiotic resistance with more than 80% of *E. coli* resistant to penicillins, cephalosporins and fluroquinolones and the current trend is not showing any hope for betterment (http://www.cddep.org/resistancemap/).

In the last half century the quantity of antibiotics our earth's microorganisms have been exposed might be to the tune of millions of metric tons. This indiscriminate usage of antibiotics has resulted in selection pressure and emergence of multidrug resistant superbugs.[2] The

scenario is even worse in India since antibiotics can be obtained over the counter and recently from online shopping without any valid doctor's prescription.

Strategies to control the development of resistance are the need of hour and educating general population about appropriate antibiotic usage is one among them. Public who are aware about issues related to antibiotic resistance will exert less pressure on doctors to prescribe antibiotics.[3] The educational materials distributed by the Swedish strategic programme for rational use of antimicrobial agents and surveillance of resistance (STRAMA) has resulted in decrease in antibiotic prescription in Sweden since 1993 and drastic improvement in resistance patterns.[4]

For developing educational programs to improve awareness of population about rational antibiotic usage we need to analyze their current knowledge, attitudes and practices.[5] This study aims to collect such background information and identify specific lacunae in their KAPs which can be targeted.

METHODS

This cross sectional study was conducted at SRM medical college hospital & research institute in Chennai, Tamil Nadu, India after obtaining institutional ethical clearance. The study was done for a period of 3 months from September 2015 to November 2015 and 491 parents attending pediatrics department's OPD were included.

After obtaining informed consent to participate, parents were given a pre-tested questionnaire comprising of 27 questions related to antibiotic usage and resistance. The questions were selected after reviewing previous studies.[6-8] and modified to suit Indian scenario. Both English & Tamil versions were made available. Parents either filled up the questionnaire independently or the researcher read the questions and recorded the answers for them.

Demographic data like age, sex, education level and number of children comprised the initial part of questionnaire. Remaining questions can be broadly grouped under four major categories- knowledge related to antibiotic indications, means of accessing antibiotics, antibiotic resistance and doctor-patient relationship. Parents could choose any of the three responses "Accept", "do not accept", and "do not know."

Statistical analysis

Data was entered; coded and analyzed using SPSS version 22. Descriptive statistics such as frequency, percentage and inferential statistics such as odds ratio and chi square were used to analyze the data. The level of statistical significance was set at $p<0.05$. For deriving association between knowledge about effectiveness of antibiotics and factors associated with it, we assigned one mark for each correct response to subsequent four questions (antibiotics are effective against bacteria, antibiotics are not effective against viruses, antibiotics do not speed up recovery from a cold and Inflammation of the ear in a child almost always do not need to be treated with antibiotics) and zero for incorrect response. Mean score of less than 2 was considered poor knowledge. Similarly for assessing trust we included the following questions (I trust the doctor's decision if s/he decides not to prescribe antibiotics, I trust the doctor not prescribing antibiotics) and scored in same manner.

RESULTS

Table 1 describes the demographic characters of the study participants. A total of 491 participants completed the survey questionnaire. Out of the 491 participants 55.6% were females and 44.4% were males. Majority of the participants (88%) were between the age group of 20-40 years. Also78.8% participants had at least one child aged less than 6 years. Seventy four per cent had educational level of graduate and above, 24.9% had up to high school and a meager 1.6% were illiterate. Out of the total, only 5.9% had prior medical training.

Table 1: Demographic characteristics of the respondents.

Characteristic	Number (n=491)	Percentage (%)
Sex		
Male	218	44.40
Female	273	55.60
Age group in years		
≤20	19	3.87
21-30	237	48.27
31-40	195	39.71
41-50	35	7.13
51-60	0	-
61-70	5	1.02
Education		
Illiterate	8	1.63
School	122	24.85
Graduate & above	361	73,52
At least one child aged <6 yrs in the family	387	78.82
Prior medical training	29	5.91

Table 2 shows the percentage of participants giving appropriate response to statements that focused on key concepts of knowledge, attitude and practice regarding antibiotic usage, side-effects and resistance.

Pertaining to the knowledge component 66.8% of the respondents mentioned that they have used an antibiotic at least once; still only 24.2% were able to name an antibiotic correctly. Forty four per cent agreed that

antibiotics are effective against bacteria and 17.1% agreed that antibiotics are not effective against viruses. About half of the participants (47.2%) were aware that frequent and indiscriminate use of antibiotics can cause resistance. Similarly 45% were able to correctly identify side-effects of antibiotic usage.

While assessing the participant's attitude towards antibiotic usage, 22.2% of the respondents had children who were administered antibiotics more than 6 times a year in the past. Only 20.3% agreed that antibiotics are not necessary for fever of short duration and 21.5% correctly identified that ear infection in children doesn't always necessitate treatment with antibiotic. Only 13.6% of the respondents stated that antibiotics don't speed up recovery from cold. While analysing the patient-doctor relationship, 69.2% expected the doctor to prescribe antibiotics and less than half the number (47.6%) trusted the doctor's decision for not prescribing antibiotics. It is worthy to note that 65.5% agreed that doctor's always take time during consultation to explain how antibiotics should be used.

Regarding the respondent's practice towards antibiotic usage two third (64.2%) of them were of the opinion that a course of antibiotics should be completed even if they feel better after half the treatment and 64.1% agreed that left over antibiotics should not be reused at a later date and 71.8% agreed that antibiotics are not to be purchased as over the counter drugs from the chemists.

Table 3 shows the factors that are significantly associated with better of knowledge about effectiveness of antibiotics usage. Subjects with prior medical training have 18.7 times (CI 6.6-57.8, P=0.001) better knowledge compared to those without prior training. The same holds true for subjects with children below 6 years of age as they are 2.6 times (CI 1.4-5.1, P= 0.002) well informed compared to those without. Similar association was observed with educational status as subjects of graduate level and above had 13 times better knowledge than those with school level education and illiterates. Whereas we observed only a marginal association with gender (OR 0.65, CI 0.4-0.99, P=0.04) and no association with age groups (OR 0.76, CI 0.5-1.2, P=0.216) against better knowledge about antibiotic effectiveness. There was no significant association between trust and antibiotic prescription.

Table: 2 Percentage of respondents giving correct response to statements.

Statement	Number (n=491)	Percentage (%)	95% CI
Antibiotic- general knowledge, usage, side-effects & resistance			
Able to name an antibiotic correctly	119	24.2	20.3-28.1
Used an antibiotic at least once	328	66.8	62.5-71.0
Antibiotic are effective against bacteria	214	43.5	39.1-48.0
Antibiotic are not effective against viruses	84	17.1	13.7-20.5
Colds are caused by viruses	325	66.1	61.9-70.4
Colds are not caused by bacteria	70	14.2	11.1-17.4
Frequent use of antibiotic can increase the resistance of bacteria to them & decrease future effectiveness	232	47.2	42.7-51.7
Antibiotic usage disturbs the gut flora and causes diarrhoea	221	45.0	40.5-49.5
Attitude towards antibiotic usage			
Respondents with children receiving antibiotics more than 6 times a year	109	22.2	18.4-25.9
Antibiotics are not needed for fever of even one day	100	20.3	16.7-24.0
Ear infection in children always doesn't require antibiotic treatment	106	21.5	17.8-25.3
Antibiotics do not speed up recovery from cold	67	13.6	10.5-16.7
Antibiotics should always be prescribed by a doctor	340	69.2	65.0-73.4
I trust the doctors decision for not prescribing antibiotics	234	47.6	43.1-52.1
Doctors always explain in detail how antibiotics should be used	322	65.5	61.2-69.8
Practice towards antibiotic usage			
A course of antibiotic should be completed even if you feel better after half the treatment	312	64.2	60.9-68.5
Left over antibiotics should not be reused at a later date	315	64.1	59.8-68.4
Antibiotics should not be purchased as over the counter drugs from pharmacy/chemists	353	71.8	67.8-75.9

Table 3: Factors associated with knowledge about effectiveness of antibiotics.

Parameters	Knowledge about effectiveness of antibiotics		OR (95% CI)	Chi square, P value
	Present (118)	Absent (373)		
Medical training				
Yes	24	5	18.79 (6.6-57.8)	58.22
No	94	368		0.0001
At least one child < 6 years age				
Yes	105	282	2.61 (1.4-5.1)	9.61
No	13	91		0.002
Gender				
Male	43	175	0.65 (0.4-0.99)	3.99
Female	75	198		0.046
Education				
1 & 2	102	259	2.81 (1.58-4.97)	13.31
3	16	114		0.0002
Age group				
≤30 years	46	194	0.76 (0.5-1.2)	1.53
>30 years	56	179		0.216
Doctor prescribing antibiotic				
Trust	272	93	0.72 (0.44-1.19)	1.63
No trust	101	25		0.202
Doctor not prescribing antibiotic				
Trust	76	29	0.79 (0.48-1.28)	0.941
No trust	297	89		0.332

DISCUSSION

Currently little is known about the general public's knowledge of antibiotic resistance in India as well as globally. Antibiotic resistance is occurring world over and can affect any one, of any age, in any country. Though antibiotic resistance occurs naturally, it is the misuse of antibiotics in humans and animals that is hastening the process.

This study presents a number of vital observations in relation to antibiotic usage, levels of knowledge, understanding of the problem of antibiotic resistance and side-effects.

The results on the understanding of the respondent's knowledge clearly show a high level of misunderstanding. This is evident from the fact that only 17.2% were aware that antibiotics are not effective against viruses and less than half knew that bacterial infections are treated with antibiotics. Similarly less than one fourth (14.2%) were of the notion that bacterial infection does not cause colds. These finding are in agreement with several recent reports from India[7] and western countries.[9,10] They have a general misconception that infection of any origin needs antibiotic treatment.[11] This could be attributed to the fact that while explaining the nature of the disease to a layman, physicians use the general term as microbes rather than clearly stating it as bacterial or viral.[12] It is worthy to note that almost half the respondents were aware of antibiotic resistance (47.2%) and side-effects (45%) related to antibiotic usage. In a similar study done by Agarwal et al[7] the authors reported poor knowledge regarding antibiotic resistance. Only 15.5% of the parents included in their study were aware of the term "antibiotic resistance". In a Swedish study by Andre et al 8 81% of the participants could correctly identify that bacteria's become resistant to antibiotic treatment. One reason for the conflicting results observed between our study and Agarwal et al[7] could be due to the fact that large proportions of our study population (74%) were educated to the level of graduate and above. Also those with prior medical training (5.6%) were associated with 18 times better knowledge (Table 3). This is an indication that higher level of education and mass awareness campaign can result in better knowledge about antibiotic resistance and side effects. This is comparable to a study in Indonesia where women and people with low level of formal education were found to have more misconceptions about antibiotics.[13]

In regards to compliance to treatment 64.2% reported completing a course of antibiotic even if they felt better after half the treatment. Notable in this study, is the restrictive attitude towards self-medication as 70% felt that antibiotics should be prescribed only by a doctor 71.8% indicated buying antibiotics as over the counter drug from chemists without prescription is harmful and 64.1% agreed that left over antibiotics are not to be used

at a later date as self-medication or for others with similar complaints. These results were comparable to a study done by Oh et al where 71.1% participants stated to have completed the course of antibiotics as prescribed by their doctors.[14] In case of trusting the doctor, it is encouraging to note that the attitude of the participants remained the same, irrespective of receiving/not receiving an antibiotic prescription. This is evident from the fact that we could not establish any significant association between doctors those who prescribe antibiotics and vice-versa (Table 3). Trust is associated with increased satisfaction and adherence to treatment which is reflected as the restrictive attitude towards self-medication.[15] This also emphasizes the role of the health care providers in educating the common public during consultations as 65.5% agreed that doctors always take time to explain in detail how antibiotics are to be used.

In terms of attitude, changes have to be brought as just 20.3% of the respondents discerned antibiotics are not needed for fever of one day and as little as 13.6% knew that antibiotics do not speed up recovery from cold. Similarly less than one fourth (21.5%) considered ear infection in children always doesn't require antibiotic treatment and 22.2% had children receiving antibiotic more than six times in the past year. Such observations obviously display the patient's strong influence for prescribing antibiotics by the physician.[16] To decrease indiscriminate antibiotic use patients should be rightly educated about the hazards and limited benefits of such use, and clinicians should consider appropriate responses to the patient pressures to prescribe antibiotics.

Our study has few limitations. Since most of the participants are educated there is a bias of favorable responses towards antibiotic awareness and hence cannot be extrapolated to general population as a whole. Also most of the participants are parents of sick children attending outpatient department who might have higher trust towards doctors thereby adding further bias to results.

CONCLUSION

To summarize only one third had knowledge about right usage of antibiotics but people with prior medical knowledge were thirteen times better suggesting the role of educating public. Half the respondents were aware of antibiotic resistance but don't seem concerned as two thirds expect the doctor to prescribe antibiotics. Also half of them don't trust a doctor for not prescribing antibiotics which enlightens the fact that interventional programs imparting education is not enough but also changing the attitude of general population is equally important.

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