

## Knowledge, Attitude and Practice of Paramedical Staff Towards Antibiotic Usage and its Resistance

KANIMOZHI SADASIVAM<sup>1\*</sup>, BALAJI CHINNASAMI<sup>2</sup>,  
BALAJI RAMRAJ<sup>3</sup>, N. KARTHICK<sup>4</sup> and A. SARAVANAN<sup>5</sup>

<sup>1</sup>Department of Physiology, SRM Medical College, Hospital & Research Institute, Potheri, Kattankulathur, Chennai- 603203, India.

<sup>2</sup>Department of Pediatrics, SRM Medical College, Hospital & Research Institute, Potheri, Kattankulathur, Chennai- 603203, India.

<sup>3</sup>Department of Community Medicine, SRM Medical College, Hospital & Research Institute, Potheri, Kattankulathur, Chennai- 603203, India.

<sup>4</sup>Department of Physiology, SRM Medical College, Hospital & Research Institute, Potheri, Kattankulathur, Chennai- 603203, India.

<sup>5</sup>Department of Physiology, SRM Medical College, Hospital & Research Institute, Potheri, Kattankulathur, Chennai- 603203, India.

\*Corresponding author E-mail: dr\_kani2002@yahoo.co.in, kanimozhi.s@ktr.srmuniv.ac.in

<http://dx.doi.org/10.13005/bpj/944>

(Received: February 01, 2016; accepted: March 16, 2016)

### ABSTRACT

To measure the knowledge, attitude and perceived practices about antibiotic usage and antibiotic resistance among Para-medical staffs working in a medical college & tertiary care hospital. This is a cross-sectional quantitative questionnaire based study in which four forty one paramedical staffs were given a 25 item pretested self-administered questionnaire. The survey questions focused on key topics related to antibiotic knowledge, attitude and perceived practices pertaining to antibiotic usage. The response rate was 100%. Majority of participants were less than 30 years of age and graduates. They demonstrated good knowledge of antibiotic resistance (82%) and side effects (91%). However, there was general misconception regarding indication of antibiotic treatment with only 17.1% agreeing that antibiotics have no role against viruses. The overall attitude was poor as 66% expected antibiotic prescription for short duration fever and common cold. An alarming 93% anticipated treatment with antibiotics for ear infection in children. Among the participants nurses and pharmacists had 4 times better knowledge about antibiotics as compared to other paramedical staffs. There was no significant association between antibiotic prescription patterns and trust over doctors. Majority of participants' knowledge towards antibiotic resistance and side effects were above par. Still, their attitude and practices concerning usage is poor and outcome based education like frequent CME's and awareness campaign could be an effective approach to bridge the gap between from knowledge to practice.

**Key words:** Antibiotics, knowledge, antibiotic resistance, self-medication, paramedical staffs

### INTRODUCTION

Antimicrobials are the most commonly prescribed drugs in clinical practice. At the same time, very often antimicrobial use is either unnecessary or inappropriate. This indiscriminate use of antibiotic has significantly contributed to the problem of antibiotic resistance.<sup>1</sup> As antibiotic

resistance is growing in leaps and bounds it poses to be a major threat to health care delivery. Concurrently, treatment of lethal bacterial infections has become difficult due to the appearance and rapid spread of antibiotic-resistant bacteria.<sup>2</sup> The situation is more serious in developing countries because of self-medication without prescription, over-the counter sales of antibiotics, inadequate

regulation of antibiotics, high cost of medical consultations and dissatisfaction with medical practitioners.<sup>3,4</sup> It is seen that greater than 50% of antibiotics worldwide are bought without prescription.<sup>5</sup> Though antibiotic resistance is an alarming problem it has reminded a low-priority area in developing nations. Thus the magnitude of the problem remains largely unknown and only few studies are published addressing these issues.<sup>6</sup> Thus to curtail antibiotic resistance we need to first assess the knowledge and perceptions and prescribing pattern of the health care providers. Several studies have focused on the general public's knowledge, attitude and practice about antibiotic usage and resistance, whereas similar studies among health workers are very scarce. Even the few that have been published aimed to assess the antibiotic prescribing pattern among physicians.<sup>7,8</sup> It is important to understand that Nurses and other paramedical staffs in hospitals also play a vital role in prevention of transmissions of resistant bacterial infections and promotion of awareness on antibiotic resistance among patients and communities.

Hence, this study aimed at obtaining the knowledge, attitude and practice of antibiotic usage among nurses and other paramedical staffs like technicians, optometrist, audiologists, lab assistants, pharmacists and physiotherapists.

## **MATERIAL AND METHODS**

### **Study design**

This is a cross-sectional survey based study.

### **Study area**

After obtaining the institutional ethical committee clearance (699/IEC/2014) this study was conducted at SRM Medical College, Hospital & Research centre at Kattankulathur campus of SRM University.

### **Duration of the study**

This study was conducted over a period of three months.

### **Study population and sample size**

A total of 441 paramedical staffs (nurses,

technicians, optometrist, audiologists, lab assistants, pharmacists, physiotherapists and clerks) who volunteered were included in this study. Written informed consent was obtained from all participants before inducting them in the study.

### **Study tool**

The data was collected from the participants using a self-administered pretested questionnaire. The questionnaire contained 4 parts and a total of 25 questions. In the first part participants were asked to provide information about their socio-demographic profile. The second part consisted of questions that assessed their knowledge, the third part evaluated the participant's attitude and the final section included questions that measured the practices of the respondents towards antibiotic usage and resistance. Except for the first part, the participants had to choose any one of the three responses ie "yes", "no" or "don't know" for the remaining questions. The 25 questions included in the survey were prepared by a thorough literature search of the published studies that are relevant to our survey. The questionnaire was prepared in English and later translated to Tamil. The same questionnaire was used by us in our previous survey to ascertain the common public's knowledge, attitude and practice on antibiotic usage and resistance.<sup>9-12</sup>

### **Statistical analysis**

The entire data was entered in Microsoft Excel and analyzed using SPSS version 22.0. Frequency and percentages among Descriptive statistics were used to describe the data and as Odds ratio and Chi square among Inferential statistics were used to analyze the obtained data. Four questions were used to derive the association between knowledge about effectiveness of antibiotics and factors influencing it (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). Each question was assigned one mark for correct response and zero for incorrect response. Mean score of more than or equal to 2 was considered to be with good knowledge. Similarly Trust on doctors was assessed by utilizing 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 scoring was done in similar manner.

## RESULTS

The response rate was 100% among the 441 participants who were administered the questionnaire. Of the total study participants 29%

(129) were males and the remaining 71% (312) were females. Among them 14% (62) denied having obtained any prior medical training. And 73% (321) respondents had at least one child less than 6 years old in their family. Almost all our participants (96%) were between 20-40 years of age and had education (93%) of graduate level and above. Table 1 summarizes the complete socio-demographic profile of the study subjects.

**Table 1: Socio-demographic characteristics of the study participants**

Characteristic	Number (n= 441)	Percentage (%)
Sex		
Male	129	29.25
Female	312	70.74
Age group in years		
21-30	223	50.56
31-40	200	45.35
41-50	18	4.08
<b>Education</b>		
Illiterate	0	0
School & college	30	6.80
Graduate & Above	411	93.19
At least one child aged <6 years in the family	321	72.78
Without prior medical training	62	14.05

Table 2 describes the complete list of survey questions used for assessing the knowledge, attitude and practices of the study respondents along with percentage of respondents giving agreeing for the statements used in the survey questionnaire.

Regarding the general knowledge, usage, side effects and resistance to antibiotics- 88% (390) were able to name a few antibiotics. Almost all of them 96.5% (426) reported to have used antibiotics at least once in their lifetime. Nearly half of them 46.7% (206) were aware that antibiotics are used to combat bacterial infections and only a meager 17% (84) were in agreement that antibiotics are not effective against viral infections. Two third 88.4% (390) of them were of the view that colds are caused by viruses and a whopping 94.7% (418) stated colds are caused by bacteria. Regarding antibiotic resistance and side-effects 82% (362) were well informed that frequent use of antibiotics will lead to resistance and decrease future effectiveness and

91% (402) knew about common side-effects to antibiotic treatment.

Concerning the attitude and practice towards antibiotic usage, 66% (291) felt antibiotics should be prescribed even for fever of short duration and 93% (410) expected that ear infection in children should always be treated with antibiotics. Half of the respondents 44% (193) had children receiving antibiotics six times in the past year. Though 88% (388) felt antibiotics speed up recovery from cold, 86% were clear that antibiotics should be prescribed only by a physician and 70.3% (310) trust the doctor's decision for not prescribing antibiotics. But while evaluating their practice towards antibiotic usage only 66% (290) were against obtaining antibiotics as over the counter drugs and a good 91% (402) believed that a course of antibiotics should never be stopped half way and 83.4% (368) specified that left over antibiotics should not be used at a later date. Similarly 67% (294) were content as they described that doctor's

always take time to explain in detail how antibiotics should be used.

Factors associated with knowledge about effectiveness of antibiotics are tabulated in table 3. It is clear that those who had medical training had 11.4 (CI 1.62-10.65) times better knowledge. Same applies to those who are young and have at least one child less than 6 years of age as they have 3 (CI 1.63-4.99) and 9 (CI 4.72-17.14) times better knowledge than those without. There were no significant gender differences with respect to knowledge and those with better knowledge had better trust on the physician whether he/she prescribes an antibiotic or not.

### DISCUSSION

Our study spawns useful information about the knowledge, attitudes, and the practices of paramedical staffs with respect to antibiotic usage

and resistance. The results from our study clearly show that the knowledge of paramedical staffs regarding antibiotic resistance and side effects are above par. This is similar to recent studies which have also established a good knowledge among students of paramedical courses.<sup>9</sup> These findings are encouraging as better knowledge is often correlated well with better health practices. However misunderstanding about antibiotic indication and effectiveness is clearly evident as only 17% knew that antibiotics are not effective against viruses and 46% were aware that antibiotics are used to treat bacterial infections. Among our participants nursing staffs and pharmacists had 4 times (Table 3) better knowledge about antibiotic effectiveness compared to other paramedical staffs. Age also seems to be an important factor associated with better knowledge as our participants less than 30 years of age demonstrated 2.8 times improved understanding about antibiotic usage compared to older participants. The reason for such a finding

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

Statement	Number (n=441)	Percentage (%)
Antibiotic- general knowledge, usage, side-effects & resistance		
Able to name an antibiotic correctly	390	88.4
Used an antibiotic at least once	426	96.5
Antibiotic are effective against bacteria	206	46.7
Antibiotic are not effective against viruses	84	17.1
Colds are caused by viruses	390	88.4
Colds are caused by bacteria	418	94.7
Frequent use of antibiotic can increase the resistance of bacteria to them & decrease future effectiveness	362	82.0
Antibiotic usage disturbs the gut flora and causes diarrhoea	402	91.1
Attitude towards antibiotic usage		
Respondents with children receiving antibiotics more than 6 times a year	193	43.7
Antibiotics are needed for fever of even one day	291	65.9
Ear infection in children always require antibiotic treatment	410	92.9
Antibiotics speed up recovery from cold	388	87.9
Antibiotics should always be prescribed by a doctor	379	85.9
I trust the doctors decision for not prescribing antibiotics	310	70.3
Doctors always explain in detail how antibiotics should be used	294	66.6
Practice towards antibiotic usage		
A course of antibiotic should be completed even if you feel better after half the treatment	402	91.1
Left over antibiotics should not be reused at a later date	368	83.4
Antibiotics should not be purchased as over the counter drugs from pharmacy/chemists	290	65.75

could be due to the fact that younger people tend to have more infants and toddlers who would have commonly frequented to physician visits and resulted in enhanced knowledge. Also younger generation has better access to electronic media, and finally their curriculum already has imparted changes pertaining antibiotic awareness. The misconception between viral and bacterial infection is no different from general public's knowledge as our previously published data show that a meager 14% of the participants knew that antibiotics are not effective against viruses. Numerous studies have similarly reported that more than 60% of their participants believed that antibiotics should be prescribed for viral illnesses.<sup>13</sup> Such confusion may lead to inappropriately high rates of antibiotic intake, which can further aggravate the already increasing bacterial resistance. This calls for an immediate need to inculcate a clear understanding about antibiotic effectiveness at an earlier stage of the medical education in paramedical staffs.

The findings of the current study showed

a negative attitude of paramedical staffs towards antibiotic usage. About half of the respondents reported to have administered antibiotics more than 6 times to their children in the past year (Table 2). Further 92% are of the opinion that ear infection in children always warrants antibiotic prescription and 66% want to be treated with antibiotics even for short duration fever of one day. However, in spite of their lax attitude, our respondents practice with regards to antibiotic use was found to be satisfactory. A majority 86% always consulted a doctor before starting on an antibiotic and most of them 91% always completed the full course of the prescribed treatment. Nevertheless, it is discouraging to note that only 65% agreed that antibiotics should never be purchased as over the counter drugs and doctors take time to explain in detail the do's and don'ts about antibiotics. There was no significant association between antibiotic prescription patterns and trust over doctors (Table 3). These results are in line with other published study which also reported the same.<sup>13, 14</sup> This emphasizes the need

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

Parameters	Knowledge about effectiveness of antibiotics		OR (95% CI)	Chi square, P value
	Present (79)	Absent (362)		
Medical training				
Yes (Nursing staff)	73	272	4.03 (1.62-10.65)	11.35
No (Technicians, clerks etc.)	6	90		0.0008
At least one child < 6 years age				
Yes	64	117	8.93 (4.72-17.14)	63.54
No	15	245		0.0001
Gender				
Male	28	101	1.42 (0.82-2.45)	1.78
Female	51	261		0.182
Education				
2	13	17	4.00 (1.73-9.17)	14.14
3	66	345		0.0002
Age group				
≤30 years	56	167	2.84 (1.63-4.99)	15.90
>30 years	23	195		0.0001
Doctor prescribing antibiotic				
Trust	79	260	—	28.96
No trust	0	102		0.0001
Doctor not prescribing antibiotic				
Trust	62	215	2.49 (1.36-4.63)	10.12
No trust	17	147		0.001

to educate paramedical staff as well as students.<sup>15</sup> In such scenarios outcome based education like frequent CME's and awareness campaign could be an effective approach to bridge the gap between from knowledge to practice. Also under and post graduate paramedical education stratagems should aim, not only to increase the knowledge, but also to change the behavior and to improve the student outcomes.<sup>16</sup> They have to be personalized according to the younger generations development, capabilities and experience.<sup>13</sup>

The strength of this study is that it addresses the major problem of antibiotic use and resistance among paramedical staffs in whom much research has not been conducted in the past. This population remains to be untouched, stemming from the fact paramedical staffs are closely associated with physicians and it's a general perception that they would have better understanding about antibiotics. Our study does have certain limitations; firstly the convenience sampling approach of including participants from only one medical college limits the extrapolation of results. Secondly, as with most surveys, it is possible

that respondents might have given socially desirable answers, rather than their true opinions or practices.

## CONCLUSION

Our study showed good knowledge of Paramedical staff's with regards to antibiotic resistance and side effects, nonetheless their attitude and practices toward antibiotic usage are often contradictory and poor. These contradictory outlooks present challenges that must be overcome if we have to effectively tackle the escalating problem of antibiotic resistance. This study suggests that, to prevent the development of antibiotic resistance, we should promote education activities about antibiotic treatment, craft novel policies to attract attention to campaigns about antimicrobial resistance deterrence.

## ACKNOWLEDGEMENTS

We would like to express our heartfelt thanks to the questionnaire respondents who graciously accepted to participate and devote their valuable time to the study.

## REFERENCES

1. WHO. The Evolving Threat of Antimicrobial Resistance: Options for Action (2012) from: <http://www.who.int/publications/2012/9789241503181eng.pdf>
2. Vila J, Pal T. Update on antimicrobial resistance in low-income countries: Factors favoring the emergence of resistance. *Open Infect Dis J* 4: 38–54 (2010).
3. Byarugaba DK: A view on antimicrobial resistance in developing countries and responsible risk factors. *Int J Antimicrob Agents* 24:105–10.
4. Grigoryan L, Burgerhof JGM, Degener JE, et al. Self-Medication with Antibiotics and Resistance (SAR) Consortium. Determinants of self-medication with antibiotics in Europe: the impact of beliefs, country wealth and the healthcare system. *J Antimicrob Chemother* 61:1172–79 (2008).
5. Cars O, Nordberg P: Antibiotic resistance - The faceless threat. *Int J Risk Saf Med* 17:103–10 (2005).
6. Aggarwal S, Mathew J, Singh H, Sharma V. Attitude and perception of junior resident doctors' regarding antibiotic resistance—A pilot study. *Journal of Acute Disease* 3(1): 6-9 (2014).
7. Abbo L, Sinkowitz-Cochran R, Smith L, Ariza-Heredia E, Gómez-Marín O, Srinivasan A, Hooton TM: Faculty and resident physicians' attitudes, perceptions and knowledge about antimicrobial use and resistance. *Infect Control Hosp Epidemiol* 32:714–28 (2011).
8. Kheder SI: Physicians knowledge and perception of antimicrobial resistance: A survey in Khartoum State Hospital settings. *Br J Pharmaceut Res* 3:347–62 (2013).
9. Jamshed SQ, Elkalmi R, Rajiah K, Al-Shami AK, Shamsudin SH, Siddiqui MJ, et al. Understanding of antibiotic use and resistance among final-year pharmacy and medical students: A pilot study. *J Infect Dev*

- Ctries* **8**:780–85 (2014).
10. Khan AK, Banu G, Reshma KK. Antibiotic resistance and usage-A survey on the knowledge, attitude, perceptions and practices among the medical students of a Southern Indian teaching hospital. *J Clin Diagn Res* **7**:1613–16 (2013).
  11. Andre M, Vernby A, Berg J, Lundborg CS. A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden. *J Antimicrob Chemother* **65**(6): 1292-6 (2010).
  12. Chinnasami B et al. "Knowledge, attitude and practice of parents towards antibiotic usage and its resistance." *International Journal of Contemporary Pediatrics* 256-61 (2016).
  13. Azevedo MM, Pinheiro C, Yaphe J, Baltazar F. Portuguese students' knowledge of antibiotics: a cross-sectional study of secondary school and university students in Braga. *BMC Public Health* **9**:359 (2009).
  14. Mitsi G, Jelastopulu E, Basiaris H, Skoutelis A, Gogos C. Patterns of antibiotic use among adults and parents in the community: A questionnaire-based survey in a Greek urban population. *Int J Antimicrob Agents* **25**: 439–43 (2005).
  15. Chambless DL, Hollon SD. Defining empirically supported therapies. *J Consult Clin Psychol* **66**: 7–18 (1998).
  16. Davey P, Garner S. Professional education on antimicrobial prescribing: a report from the Specialist Advisory Committee on Antimicrobial Resistance (SACAR) Professional Education Subgroup. *Journal of Antimicrobial Chemotherapy* **60**(Suppl. 1): i27-i32 (2007).