

# Antimicrobial use and resistance awareness – A cross sectional study among general public in and around Chennai.

Nandini. M.S<sup>1\*</sup>, Bupesh Giridharan<sup>2\*\*</sup>, Chitrallekha Saikumar<sup>3\*\*\*</sup>, Haasini Mohan<sup>4\*\*\*\*</sup>, Dhevha Harini Sa<sup>5\*\*\*\*\*</sup>, T.Puhazhendhi<sup>6</sup>

*Department of Microbiology, Sree Balaji Medical College and Hospital, BIHER, Chennai-600044.*

*Research and Development Wing, Sree Balaji Medical College and Hospital, BIHER, Chennai-600044.*

*Department of Public Health Dentistry, Sree Balaji Dental College and Hospital, BIHER, Chennai-600100*

*Dr. Nandini. M.S*

*Corresponding author*

*Email id: [drmsnandini@gmail.com](mailto:drmsnandini@gmail.com)*

## **Abstract-**

**Background:** Antimicrobial resistance is now an emerging global threat and there is an upsurge of multidrug resistant bacteria. As general population plays a major role in use and abuse of antibiotics, their knowledge and practice regarding antimicrobials needs proper assessment. **Method:** This was a cross sectional study among 250 participants among age group 18 – 60 years. **Results:** Results showed that 34% felt that antibiotics can cure viral infections and 32% would discontinue antibiotic course in midway. 34% of responders would purchase antibiotics over the counter without prescriptions and 26% would use the leftover antibiotics. **Conclusions:** There is a wide gap in knowledge in antibiotic usage and attitude among responders regarding antibiotic usage. This can be filled by educating the public about usage and hazards of antimicrobial drug resistance by incorporating it in school curriculum and conducting awareness programme through various media.

**Key words:** Antimicrobial resistance, knowledge Background

, Attitude, practice, general public.

With the discovery of Penicillin in 1928, a new era of antibiotics started but not even a century old, we are already facing multidrug resistance superbugs<sup>[1]</sup>. Multidrug resistance organisms are a huge burden to the community and healthcare as they increase the cost of treatment and duration of stay<sup>[2]</sup>. The reason for this is can be multi-factorial like over- the- counter sale of drugs<sup>[3]</sup>, lack of policy and regulation in drug prescription<sup>[4]</sup>, complex interaction between knowledge and behaviour of the prescriber, poor doctor – patient interaction<sup>[5]</sup>. Patient's knowledge, attitude and practice of antimicrobial usage have also contributed to the emergence of drug resistant microorganisms<sup>[6]</sup>. Sharing of prescriptions and re-use of antibiotics were high among the public and many discontinued antibiotics once symptoms subsided<sup>[7]</sup>. WHO<sup>[8]</sup> has reported that there is increase in antimicrobial resistance worldwide and has led to increase in morbidity and mortality. Among the worldwide, India is one of the leading consumers of antimicrobials<sup>[9]</sup> therefore the Government of India had launched a media campaign 'Medicines with redline' on antibiotics to create an antimicrobial resistance awareness among public in February 2016<sup>[10]</sup>. Hence this study aims to assess the level of knowledge, attitude and practice of antibiotics among the general public in and around Chennai.

## **Materials and methods:**

This was a cross sectional study over a period of 4 months from March to may 2019 in Chennai, which is one of the metro cities of India. A structured questionnaire was prepared by reviewing previous studies and altered to our needs<sup>[4,11,12]</sup>. It was prepared both in English and Tamil which is the local language. We aimed to interview 250 individuals with the age group of 21 – 60 years both male and female excluding people related to medical profession and person who were not aware of the term antibiotics. Verbal informed consent were obtained and second year medical students helped the public in answering the questionnaires, and clearing the doubts. The questionnaire included standard demographic data, knowledge, attitude and behaviour towards antibiotics, access to antibiotics, Self medication. The questionnaires were pre-tested on a representative sample to apply and validate the required modifications. The first part of the questionnaire includes the demographic characteristics of the participants including age gender, educational qualification and occupation. Second part included questions regarding knowledge about antibiotics.

## Results:

Out of 250 individuals interviewed, only 206 were willing to participate and answered the questionnaires completely, the response rate was 82.4%. Of 206 responders, 133 (64.5%) were females and 73 (35.4%) were males Table 1. highest response was from the age group 26 - 35 (43.7%) and lowest among the > 66years (1.4%) Chart 1.

## Knowledge

Knowledge about the use of antibiotics was less, almost 53% of the responders felt that antibiotics can cure cold and flu and 33% didn't know that antibiotics are used only for bacterial infections. Only few (35%) knew the meaning of antibiotic resistance and 30% are only aware that antimicrobial resistance is a global threat Table 2 .

## Attitude

Majority of responders (52%) would take antibiotics whenever they have fever and three in - ten responders said that once in a while they would to stop taking antibiotics in one or two days if they feel better [Table 3]. 33% of them felt that it is ok to skip one or two doses in a course of antibiotics and only few would keep the remaining doses to be used in future. Only seven-in-ten responders agreed that it is wrong to consult doctor over the phone regarding intake antibiotics.

## Practice

Almost one fifth of the responders (16.5%) had used antibiotics for more than 3 times in previous year, 34% and 28% used twice and once respectively 5 % didn't remember the frequency of antibiotics used in previous year [Table 4]. Access to antibiotics, many (34%) preferred over the counter and 42% of the study group preferred doctor's prescription. Some (10%) used leftover medicines from relatives and few (14%) used previous doctor's prescription. 20% of the responders didn't check the expiry date of the antibiotics.

## Discussion

Public plays a significant role in use and abuse of antimicrobials<sup>[13]</sup> and hence there is a need for assessment of their knowledge regarding the use of antimicrobials. This study aimed to assess the knowledge attitude and practice regarding antimicrobial use. Knowledge regarding use of antibiotics was less; many did not know that cold and flu is caused by virus and 53% felt that antibiotics can be used to treat cold and flu, similar study by Awad et al<sup>[14]</sup> also showed the same results. Only half of the responders knew that antibiotics are for bacterial and not for viral infections which was in accordance to study by Awad et al<sup>[14]</sup> and Chinnasami et al<sup>[15]</sup>. This wide gap in knowledge can cause serious problems, hence this need to be addressed. In the society this gap can be filled up by proper public education about antibiotics<sup>[16]</sup>. Attitude towards the antimicrobial usage was not satisfactory as 32 % of responders said that they would stop antibiotic course in half way through if they felt better which was similar to study by Adhaf<sup>[17]</sup>, Oh et al<sup>[18]</sup> and Banerjee et al<sup>[4]</sup> . The majority of the responder's didn't realise the risk of incomplete course of antibiotics and skipping a dose. Usage of left over antibiotics was around 26% same as study by Jifar<sup>[19]</sup>. Communication between patients and doctors can be improved so that health care people can guide the people regarding the proper use of antibiotics<sup>[20]</sup>. Regarding

to access to antibiotics; 34% had taken drugs over the counter without the prescription, a Jordanian<sup>[21]</sup> study also showed the similar results. The percentage of public purchasing antibiotics over the counter is alarming which shows that there is a dire need for stringent policies for supply of antibiotics from pharmacist to public<sup>[22]</sup>. 25% of the responders said that they would take antibiotics just with a phone call without getting examined, similar results were seen in study conducted by Banerjee et al<sup>[4]</sup> in India. The knowledge gap regarding use of antibiotics and be reduced by adding antibiotic usage in the school curriculum and there is dire need for statutory antimicrobial control policies to restrict their availability to the public. Educational campaigning can be conducted to the public through various media like television, radio, social media etc, and dangers of self medication can also be emphasized. Conclusion: The present study showed that there is widespread use of antimicrobials and there was access to drugs without proper prescription. The knowledge towards antibiotics was low, poor attitude and improper practice in use of antibiotics among public. Hence proper awareness programme and strict vigilant antimicrobial policies and regulations are required to contain the spread of drug resistant bacteria. Limitation: This study should be interpreted cautiously, as it was conducted in different locations in urban areas and therefore, the result of this study may not represent the entire city. To improve this, a larger scale study needs to be conducted at different places, including rural areas, to get a diversified study population. As it is a descriptive cross-sectional study, associated factors with attitude, knowledge and practice of the study group couldn't be identified.

Conflict of interests: No conflict of interests is declared.

#### Reference:

1. Davies J, Davies D. Origins and evolution of antibiotic resistance. *Microbiol Mol Biol Rev.* 2010;Sep1;74(3):417-33.
2. van Duin D, Paterson DL. Multidrug-Resistant Bacteria in the Community: Trends and Lessons Learned. *Infect Dis Clin North Am.* 2016;30(2):377–390. doi:10.1016/j.idc.2016.02.004.
3. Morgan, D. J., Okeke, I. N., Laxminarayan, R., Perencevich, E. N. and Weisenberg, S., Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect. Dis.*, 2011, 11, 692–701.
4. Banerjee I, Bhadury T. Self-medication practice among undergraduate medical students in a tertiary care medical college, West Bengal. *J Postgrad Med* 2012;58:127-31.
5. B. E. Franco, M. A. Mart ´inez, M. A. S ´anchez Rodr ´ıguez, and A.I. Wertheimer, “The determinants of the antibiotic resistance process,” *Infection and Drug Resistance*, vol. 2, no. 1, pp. 1–11, 2009.
6. P. Davey, C. Pagliari, and A. Hayes, “The patient’s role in the spread and control of bacterial resistance to antibiotics,” *Clinical Microbiology and Infection*, vol. 8, no. supplement 2, pp. 43–68, 2002.
7. Aishwaryalakshmi, K., Sasikala, B., Sreelalitha, N., Vigneshwaran, E. and Yr, P., Assessment of knowledge perception and attitudes on medications in general population. *Indian J. Pharm. Pract.*, 2012, 5, 3–6.
8. WHO. The Evolving Threat of Antimicrobial Resistance: Options for Action. 2012. Available from: [http://www.who.int/publications/2012/9789241503181\\_eng.pdf](http://www.who.int/publications/2012/9789241503181_eng.pdf).
9. Van Boeckel TP, Gandra S, Ashok A, Caudron Q, Grenfell BT, Levin SA, *et al.* Global antibiotic consumption 2000 to 2010: An analysis of national pharmaceutical sales data. *Lancet Infect Dis* 2014;14:742-50.
10. Travasso, C., India draws a red line under antibiotic misuse. *BMJ*, 2016, 1202, i1202.
11. Vallin M, Polyzoi M, Marrone G, Rosales Klintz S, Tegmark Wisell K, Stålsby Lundborg C (2016) Knowledge and Attitudes towards Antibiotic Use and Resistance - A Latent Class Analysis of a Swedish Population-Based Sample. *PLoS ONE* 11(4):e0152160. doi:10.1371/journal.pone.0152160.
12. Shehadeh M, Suaifan G, Darwish RM, Wazaify M, Zaru L, Alja’fari S. Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. *Saudi Pharm J* 2012; 20: 125-133.
13. Davey P, Pagliari C, Hayes A. The patient’s role in the spread and control of bacterial resistance to antibiotics. *Clin Microbiol Infect.* 2002;8 Suppl 2:43–68.
14. Awad AI, Aboud EA (2015) Knowledge, Attitude and Practice towards Antibiotic Use among the Public in Kuwait. *PLoS ONE* 10(2):e0117910. doi:10.1371/journal.pone.0117910.

15. Chinnasami B, Sadasivam K, Ramraj B, Pasupathy S. Knowledge, attitude and practice of parents towards antibiotic usage and its resistance. *Int J Contemp Pediatr* 2016;3:256-61.
16. Lee CR, Lee JH, Kang LW, Jeong BC, Lee SH. Educational effectiveness, target, and content for prudent antibiotic use. *Biomed Res Int.* 2015;2015:214021. doi:10.1155/2015/214021
17. Aldhafar AS, Talat W. Knowledge, Attitude and Practice toward the Usage of Antibiotics Among Public in Al-Ahsa, Saudi Arabia. *Int J Sci Stud* 2017;4(11):14-17.
18. OhAL,HassaliMA,Al-HaddadMS,SyedSulaimanSA,ShafieAA,AwaisuA. Public knowledgeand attitudestowards antibioticusage: across-sectional studyamong thegeneralpublic inthestateof Penang,Malaysia.*JInfectDevCtries*2011; 5:338–347.PMID:21628809.
19. Jifar A. I., Ayele Y. Assessment of knowledge, attitude, and practice toward antibiotic use among Harar City and its surrounding community, Eastern Ethiopia. *Interdisciplinary Perspectives on Infectious Diseases.* 2018;2018:6. doi: 10.1155/2018/8492740.8492740.
20. Belongia EA, Schwartz B. Strategies for promoting judicious use of antibiotics by doctors and patients. *BMJ.* 1998;317(7159):668-671. doi:10.1136/bmj.317.7159.668
21. Al-Bakri AG, Bustanji Y, Yousef AM: Community consumption of antibacterial drugs within the Jordanian population: sources, patterns and appropriateness. *Int J Antimicrob Agents* 2005, 26:389-395.
22. Kalra, D. D., Kini, P. V., Kalra, R. D. and Jathanna, V. R., Assessment of self-medication among dental students in Pune city, Maharashtra: a cross-sectional survey. *J. Indian Assoc. Public Health Dent.,* 2015, 13, 318–323).

Table 1: Demographic details about the respondents

<b>Gender</b>	<b>Number</b>	<b>Percentage (%)</b>
Female	133	64.5
Male	73	35.5
<b>Educational Qualification</b>		
Education	Number	Percentage (%)
Illiterate	6	2.9
High school	15	7.28
undergraduate	113	54.85
Post graduate	72	34.95

Table 2: Knowledge towards use of antibiotics

	<b>Knowledge statement</b>	<b>Yes %/N</b>	<b>No %/N</b>	<b>unsure</b>
1	Antibiotics can cure cold and cough	53.39(110)	36.89(76)	9.7(20)
2	Antibiotics are used to cure viral infections	33.98(69)	52.42(108)	14(29)
3	Antibiotics are used to cure bacterial infections	50(103)	33(68)	16.99(35)
4	Do you know meaning of antibiotic resistance	35(72)	65(134)	-
5	Injudicious use of Antibiotics can lead to Antibiotic resistance	32(97)	42.23(87)	11(22)
6	Are you aware that Antibiotics resistance is a serious global public threat	30(62)	66.5(137)	3.39(7)
7	Antibiotics can be harmful if taken during pregnancy	51.94(107)	35.43(73)	12.62(26)
8	Antibiotics can cause allergic reactions	53.88(111)	35.43(73)	11((22)

Table 3: Attitude of the respondents towards the antibiotics

<b>Attitude statements</b>		<b>Yes %(N)</b>	<b>No %(N)</b>
1	I take antibiotics whenever I have fever	82(169)	37(99)
2	I usually stop the course Antibiotics once I feel better in one or two days	32(66)	67.96(140)
3	It is ok to skip one or two doses of Antibiotics once in a while	33(68)	67(138)
4	I keep remaining Antibiotics to be taken later when I fall sick	26.21(54)	73.78(152)
5	It is ok to take Antibiotics after consulting doctor over the phone	25.24(52)	74.75(154)

Table 4: Practice among the respondents regarding the use of antibiotics

<b>Practice</b>		<b>Number</b>	<b>Percentage %</b>
1	How many times have you taken antibiotics in previous one year		

a	Once (1)	42	20.38
b	Twice (2)	66	32
c	Thrice (3)	56	27.18
d	More than 3 times	32	15.5
e	Don't remember	10	4.85
2	Access to antibiotics		
a	Doctor's prescription	87	42.23
b	Pharmacist / over the counter	70	34
c	Relatives	21	10.19
d	Previous doctor's prescription	28	13.6
3	I do check the expiry date of the antibiotics	163	79.12

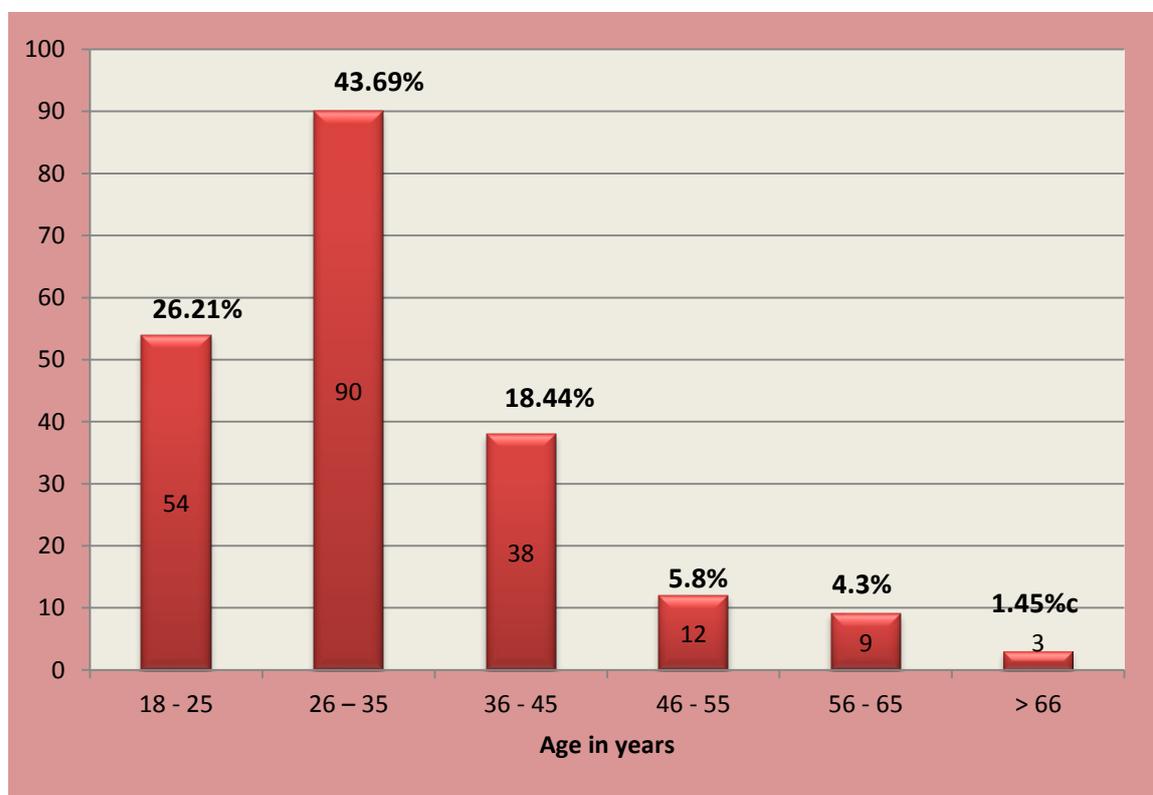


Chart 1: Distribution of Responders according to age: