Original Article

Perception of Health Professionals and the General Population Regarding the Use of Antibiotics and Antibiotic Resistance in Puducherry, South India

Priyadharsini Raman Palanisamy[1], Vimala Ananthy[2], Umamaheswari Subramanian[3]

[1]Department of Pharmacology, JIPMER, Karaikal, Puducherry, India

[2]Department of Pharmacology, MGMCRI, Puducherry, India

[3]SriVenkateshwaraa Medical College Hospital and Research Centre, Puducherry, India

ABSTRACT

Objective: The present study aims to evaluate the awareness of a sample of the general population and health-care professionals regarding the use of antibiotics and antibiotic resistance and identify the factors associated with antibiotic resistance. **Methods:** This prospective questionnaire-based study was conducted for 3 months, from July to September 2020, in Karaikal, Puducherry (India). The health professionals included doctors in pre- and paraclinical teaching departments (those not involved in clinical practice), laboratory technicians, and PhD students pharmacists. The questionnaire had two parts which health professionals answered, whereas the general population answered only the second part. **Findings:** About 38.5% of the population reported using antibiotics frequently among the responses obtained. Around 66.5% of the general population usually stop the antibiotic within 1 or 2 days after they feel better, and 11% of the people believed that adding an extra antibiotic would make them better. Among the health professionals, more than 90% responded that self-medication is the major reason for antibiotic resistance and was unsure of the overprescription of antibiotics. **Conclusion:** The results show variable responses and suggest the need for intervention programs to increase the knowledge among the general population regarding the rational use of antibiotics.

Keywords: *Antibiotic, awareness, general population, health professionals, resistance, stewardship*

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Introduction

Antibiotic resistance is a growing burden in health care all over the world. The major contributing factors to antibiotic resistance are overprescription, self-medication, overuse of antibiotics in agriculture and poultry, and poor infection control.[1-3] In low- and middle-income countries, the burden is still higher due to various reasons such as poor hygiene measures, easy accessibility to antibiotics in pharmacies, poor adherence to standard treatment guidelines, lack of awareness about the use of drugs, underdeveloped diagnostic services, poorly developed health-care systems, and illiteracy.[1-3] In 2010, Indians consumed 12.9 billion units of antibiotics, which are quite high compared to many countries, and antibiotics such as glycopeptides and lincosamides were highly used.[4] A study reported by Khare *et al*. showed that antibiotics are used at a higher rate for common illnesses in India. Informal health-care providers prescribed the drugs, and drugs such as fluoroquinolones and third-generation cephalosporins were highly prescribed.[5] As per the WHO, the strategies of a global action plan on antimicrobial resistance include increasing awareness of antimicrobial resistance, optimizing rational use of antimicrobials, and strengthening the surveillance of antimicrobial resistance.[6] India also published a national plan

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Address for correspondence:
Dr. Priyadharsini Raman Palanisamy,
E-mail: drpriya.rp@gmail.com

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(a 5-year plan from 2017 to 2022 in alignment with the global action plan to curb antibiotic resistance with five primary strategic objectives. The national plan's first and foremost strategic objective is to improve awareness regarding antimicrobial resistance through educational activities.[4] The present study aims to evaluate the understanding of a sample of the general population and health-care professionals regarding the use of antibiotics and antibiotic resistance and identify the factors associated with antibiotic resistance.

Methods

This prospective questionnaire-based study was conducted for 3 months, from July to September 2020, in Karaikal, Puducherry (India), after the approval of the scientific and institutional ethics committees. A questionnaire that contains questions regarding the use of antibiotics and antibiotic resistance was distributed to the general population and the health professionals. The health professionals include doctors in pre- and paraclinical teaching departments (those not involved in clinical practice), laboratory technicians, and PhD students pharmacists. The general population included people from various occupations such as engineering and teaching. The questionnaire used for the health professionals had two parts. The first part contains five statements to estimate the knowledge regarding antibiotic resistance, and the second part includes ten questions to evaluate the knowledge regarding the usage of antibiotics. The health professionals answered the questions in both parts, whereas the general population answered only the second part containing ten questions. The participants filled out the questionnaire after obtaining informed consent. A total number of 83 people answered the questionnaire. Among the 80 people, 40 were health professionals, and 43 were general public. All data were entered in Microsoft Excel® and calculated as a percentage.

Results

The total number of participants in the study was 83, of which 43 were from the general population and 40 were health professionals. The primary demographic characteristics of the population are described in Table 1. Most of the study population were in the age group of 30–50 yearsand males. The occupations of the health professional population were doctors in the teaching profession, laboratory technicians, PhD researchers, pharmacists, and the general population included engineers, homemakers, and government employees. The questionnaire distributed to the study population is given in Tables 2 and 3.

Table 1: Basic demographic characteristics of the study population (N=83)

	HP	GP
Age		
<30	8	4
30-50	25	33
>50	7	6
Sex		
Male	23	28
Female	17	15
Education status		
Less than UG course		8
Undergraduate	5	15
Postgraduate	35	20

GP=General population, HP=Health professionals. UG= Undergraduate

Table 2: Knowledge of the health professionals toward antibiotic usage and resistance

Statement	Percentage of agreed	Disagreed/ Unsure (%)	Correct response (%)
Antibiotics are effective in the management of viral infections	1	99	99
Antibiotic resistance is due to under prescription of antibiotics	35	65	65
Antibiotic resistance is of a minor problem as far as global health is concerned	1	99	99
Postantibiotic era is major infections killing the patients	62.5	37.5	62.5
Self-medication is one of the reasons for antibiotic resistance	98	2	98

Discussion

The present study showed that the perception and knowledge of the health professionals regarding antibiotic usage and resistance are of moderate level, and occasional educational interventions may be needed to increase the level of knowledge [Table 2 and Figure 1]. Around 35% of the health professionals are unsure that antibiotic resistance is due to overprescription of antibiotics, and 37.5% of the study population has understood postantibiotic era as major infections killing patients. Both these responses show a minimal lack of the understanding of the seriousness of antibiotic resistance among health professionals. For more than 90% of the studied population is obvious that antibiotics are not of much use in viral infections, and self-medication is the primary reason for antibiotic resistance. The major reasons for self-medication identified by a systematic review among people in South-East Asia Region are overconfidence obtained from previous treatment of

Table 3: Perception of health professionals and general population toward the use of antibiotics

Question	Frequency (%)			
	Always	Usually (very often)	Sometimes (rarely)	Never
How often do you use antibiotics prescribed by the health professional?				
HP	7 (17.5)	6 (15)	20 (50)	7 (17.5)
GP	5 (11.6)	14 (33)	20 (46.5)	4 (9)
Do you demand antibiotics even when the prescriber denies it?				
HP		0	4 (10)	36 (90)
GP	0	3 (7)	2 (5)	38 (88)
Do you follow the prescribers' advice while taking antibiotics?				
HP	32 (80)	8 (20)	0	0
GP	28 (65)	13 (30)	0	2 (5)
Do you share the leftover antibiotics with anyone?				
HP	22 (55)	1 (2.5)	17 (42.5)	0
GP	0	3 (7)	11 (26)	29 (67)
Do you stop the antibiotics if the symptoms subside?				
HP	24 (60)	5 (12)	7 (18)	4 (10)
GP	9 (21)	17 (40)	8 (18)	9 (21)
Do you complete the duration of treatment when antibiotics are prescribed?				
HP	20 (50)	12 (30)	8 (20)	0
GP	25 (58)	13 (30)	4 (9)	1 (3)
Do you try to avoid infections by washing your hands regularly and preparing food hygienically?				
HP	20 (50)	17 (42.5)	3 (7.5)	0
GP	32 (74)	7 (16)	3 (7)	0
Do you think that some animals are given antibiotics for promoting growth and preventing diseases, and they can result in resistance?				
HP	24 (60)	9 (23)	4 (10)	3 (7)
GP	15 (34)	12 (28)	8 (19)	8 (19)
Do you think it is safe to use antibiotics often?				
HP	10 (25)	13 (32.5)	10 (25)	7 (17.5)
GP	3 (7)	8 (18)	13 (30)	19 (44)
Do you think adding one more antibiotic will get you to be relieved of symptoms easily?				
HP	1 (2.5)	3 (7.5)	18 (45)	18 (45)
GP	0	5 (12.5)	17 (42.5)	20 (50)

GP=General population (N=43), HP=Health professionals (N=40). *Always and usually in Table 3 are yes responses. Sometimes and never in Table 3 are No responses.

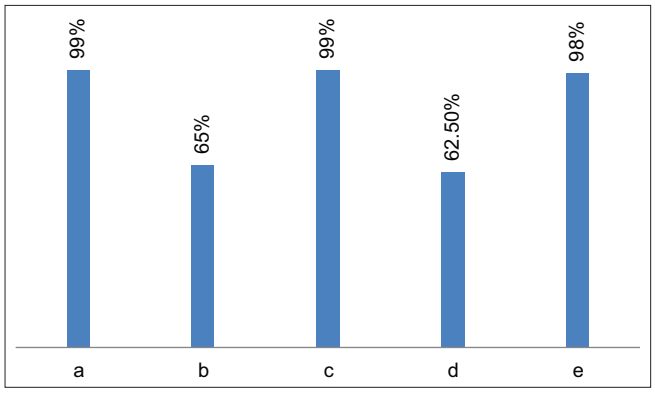

Figure 1: Perception of health professionals regarding antibiotic resistance. a: Antibiotics are effective in the management of viral infections. b: Antibiotic resistance is due to under prescription of antibiotics. c: Antibiotic resistance is a minor problem as far as global health is concerned. d: Postantibiotic era in major infections kill the patients. e: Self-medication is one of the reasons for antibiotic resistance

similar illnesses, lack of need to visit the physician, reduced consultation fees, and easy access to antibiotics in pharmacies.[7] In our study, too, the reasons for the self-medication might be the same in addition to the COVID-19 pandemic.

The results of our study are similar to the study reported by Chuckwu *et al*. in which the prescribers and health professionals had moderate knowledge of antimicrobial resistance.[8] A study reported by Nair *et al*. revealed that doctors scored a high percentage in knowledge and attitude level but had poor practicing behaviors, whereas the health-care providers had insufficient knowledge regarding the antibiotic resistance.[9] A good awareness level is mandatory among doctors, health professionals, and the general public because the lack of knowledge

is a significant reason for inappropriate prescription and use of antibiotics. The knowledge level of the prescribers may not also correlate with the prescribing behavior since the attitude may favor antibiotics even for minor and common illnesses. In rural parts of India, it was reported that antibiotics were prescribed for every common disease and broad-spectrum antibiotics by the informal health-care providers.[5] Therefore, sensitization programs, continuing medical education programs, and prescription auditing may fetch more significant benefits in reducing the burden. The microbiologists also can report the resistance pattern in any geographical area to the physicians to promote the rational use of antibiotics.

The major contributing factors to the antimicrobial resistance are frequent use of antibiotics (38.5%), stopping the antibiotics once the symptoms subside (66.5%), lack of awareness regarding the use of antibiotics as growth promoters (72.5%), and sharing leftover antibiotics (32.35%) [Table 4]. It was identified that overuse of antibiotics is a significant reason for antibiotic resistance in London, England, by a questionnaire-based study, and our study also supports the same fact.[10] Sometimes, the uncertainty of the infection also results in the irrational prescription of antibiotics. A clear diagnosis is required to prescribe the appropriate drugs. The factors that guide the choice of antibiotics as reported by physicians include causative organisms, antibiotic properties, and based on experience.[11] Physicians also should update their knowledge on the list of different classes of antibiotics such as Access, Watch, and Reserve group (AWaRe assessment tool) released by the WHO to prescribe appropriately.[12]

A multivariable analysis-based study has recommended that in addition to stopping the misuse of antibiotics, factors such as good sanitation, access to clean water, investment, and expenditure on public health care are essential to reduce the magnitude of the problem.[13]

Table 4: Factors associated with antibiotic resistance

Factor	Contributing (%)
Frequent use of antibiotics	38.5
Stopping the antibiotic after symptoms subside	66.5
Requesting antibiotic in spite of prescriber advice	3.5
Unaware of antibiotic use as growth promoters	72.5
More than one antibiotic will cure my symptoms	11
Not following prescriber's advice	2.5
Sharing left over antibiotics	32.25
Noncompletion of the duration of treatment for other reasons	16
Lack of frequent washing of hands	9
Safe to use antibiotics frequently	41.25

The results of the present study suggest the need for awareness among the general population about the rational use of antibiotics. Intervention at multiple levels, such as sensitizing the public, health professionals regarding self-medication, completion of a course of antibiotics, and avoiding the share of leftover antibiotics, is needed. The doctors should be updated regarding the recent guidelines and practice wait and watch approach. Pharmacists should be encouraged to dispense medications based on well-identified prescriptions, and the general population should be sensitized regarding the seriousness of antibiotic resistance.

Authors' Contribution

The authors P. R. Palanisamy, V. Ananthy, and U. Subramanian, contributed to the idea, questionnaire design, data collection, and analysis. The author P. R. Palanisamy was involved in manuscript preparation. All the authors approved the final manuscript.

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Conflicts of interest

There are no conflicts of interest.

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