

Assessment of Community Pharmacists' Knowledge, Attitude and Practice on Antibiotics and Antibiotic Resistance

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Abstract

Antimicrobial resistance is a major public health problem all over the globe. A cross sectional study in different zones of Hyderabad city was conducted with the aim of evaluating community pharmacists' knowledge, attitude and practice (KAP) on antibiotics and antibiotic resistance. A self-administered questionnaire was developed as data collection tool. Responses were recorded and scored using 5-Point Likert Scale. Descriptive statistics, frequencies, percentages and statistical tests were used to analyse the data. Data was collected from 40 community pharmacists. Results showed that the community pharmacist had poor knowledge on antibiotics and poor antibiotic dispensing practice. About 31(78%) pharmacists never heard about the term antimicrobial resistance. Our study highlighted that there were only 15 pharmacists who considered antimicrobial resistance as a serious issue. Most of the pharmacists (n=20) agreed that antibiotics can be dispensed without prescription. Around 26 pharmacists dispense antibiotics to treat minor ailments without a prescription. The most common reason given by community pharmacists for dispensing antibiotics without prescription was, request for antibiotics by the patients. The study highlights that there is a need for the community pharmacists to update their knowledge and improve their awareness on antibiotic resistance. Short term, intensive training programs are needed to improve their knowledge and practice regarding antibiotic use and resistance.

Keywords: Community pharmacist, antimicrobial resistance, knowledge, attitude, practice.

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INTRODUCTION

The major cause of antimicrobial resistance is overuse of antibiotics [1-4]. It is commonly seen that antibiotics are used inappropriately for self-limiting viral infections such as upper respiratory tract infections (URTIs) and acute diarrhoea [5] as well as bacterial infections including urinary tract infections (UTIs) making the bacteria resistant to antibiotics [6]. In many developing countries antibiotics are frequently dispensed by a pharmacist without prescription for self-limiting infections such as cold, flu, acute gastroenteritis where antibiotics are not necessary even when this supply remains illegal [7-9]. Non-prescription use of antibiotics is often associated with incomplete or shorter treatment courses and inappropriate antibiotics and dose choices [10].

In India, many factors contribute to development of AMR such as poor public health, a high burden of diseases, rising income and unregulated sales of antibiotics has led to rapid rise in AMR [11]. In

2010, India was the world's largest antibiotic consumer for human health at 12.9 x 10⁹ units (10.7 units per person) [12]. However the government of India has come up with many campaigns, national policies, Chennai declaration to combat AMR, Red Line campaign on antibiotics to improve awareness and prevention of AMR [13]. It also included certain antibiotics in Schedule H1 category to avoid non-prescription sale of antibiotics [14].

The community pharmacists have an important role in safe use of antibiotics in community pharmacy setting and it appears that no study evaluated the community pharmacist knowledge, attitude and dispensing practice towards antibiotics and antibiotic resistance in India. Assessment of community pharmacists' knowledge, practice and attitude regarding antibiotics and its resistance will be useful for identification of problems in order to create effective interventions in community pharmacy setting [15].

MATERIAL AND METHODS

A cross-sectional study was done in different zones of Hyderabad city using self-administered questionnaire to assess community pharmacists' knowledge on antibiotics and antibiotic resistance, attitude towards antibiotic resistance and antibiotic dispensing practice. Data from 54 community pharmacists were collected.

The questionnaire contains four sections; Demographic section contain questions on personal information of community pharmacists, educations, professional experiences, workplace location and type of pharmacies. Knowledge section contain questions on antibiotic and resistance. Attitude section examines community pharmacists' agreement with antibiotic use and resistance state as well as dispensing antibiotics without prescription. Practice section aimed to investigate pharmacists' current actions of antibiotic dispensing. The second part of questionnaire contain questions regarding current situation in practice.

RESULTS AND DISCUSSION

Data was collected from 54 community pharmacists using self-administered questions on knowledge on antibiotic use and resistance, attitude towards resistance issue and dispensing practice of antibiotics. To our surprise while data collection we were not able to find enough community pharmacies with qualified pharmacists. We found that many prescriptions were dispensed by a person without a pharmacy degree. The absence of qualified pharmacists was also seen in many other countries such as Pakistan [16], Malaysia [17], Ghana [18] and Nepal [19]. From the data obtained from 54 community pharmacists, data of 14 people was excluded (11 did not graduate in pharmacy degree and 3 were pharmacy workers). Finally, data of 40 qualified pharmacists was analyzed.

Demographics of community pharmacists

Out of 40 community pharmacists 35 were males and females were 5. Majority of the pharmacists graduated with B. Pharm degree (n=21) followed by D. Pharm (n=11) and M. Pharm (n=8). Majority of the pharmacists had a working experience of <5 years (n=15) and > 10 years (n=15) Refer Table 1.

Table 1: Demographics of community pharmacists

Demographics		n	%
Gender	Male	35	88
	Female	5	13
Age group(years)	<30	14	35
	30-39	15	38
	>40	11	28
Educational degree	D. Pharm	11	28
	B. Pharm	21	53
	M. Pharm	8	20
	Pharm. D	-	-
Working experience (years)	<5	15	38
	5-10	10	25
	>10	15	38

Knowledge on antibiotics and antibiotic resistance

All the 40 participants gave their responses to 10 questions regarding their knowledge on antibiotic use and antibiotic resistance.

Table 2 shows the results community pharmacists' knowledge on antibiotics and resistance. Overall majority of the pharmacists gave incorrect answers. Of a possible mean score of 5, the pharmacist got a mean score of 4.37 (SD=1.56) indicating not so good /poor knowledge in antibiotics and resistance. Over-use of antibiotics is a major cause of antimicrobial resistance, commonly seen in India [12] and it was

good to note that many pharmacists (n=30) had knowledge that if antibiotics taken frequently may stop working properly in future. Many pharmacists answered that common cold (n=20) and pains (n=20) can be treated with antibiotics which was also seen in other studies [20, 21]. Our study showed that, among the 40 community pharmacists interviewed, around 31(78%) pharmacists never heard of the term antimicrobial resistance and 32(80%) of them did not know the correct meaning of antibacterial resistance.

This indicates lack of community pharmacists' knowledge in antibiotics and resistance.

Table 2: Community pharmacists' knowledge on antibiotics and antibiotic resistance

Statement	Yes n (%)	No n (%)	Don't know n (%)
K1 Antibiotics is any medicament used to kill or inhibit growth of bacteria	39(98)	1 (3)	-
K2 If antibiotics taken frequently it may stop working properly in future	30(75)	8 (20)	2 (5)
K3 Did you ever come across the term called antibacterial/antimicrobial resistance	9 (23)	20(50)	11 (28)
K4 Antibiotic resistance is an important and serious public health problem in the world	12(30)	6 (15)	22 (55)
K5 Acute diarrhoea can be treated with antibiotics	20(50)	17(43)	3 (8)
K6 Patients can stop taking antibiotics when their symptoms improve before the full antibiotic course	36(90)	4 (10)	-
K7 Common cold can be treated with antibiotics	25(62)	15(38)	-
K8 Antibiotics are used to reduce any kind of Pain	20(50)	20(50)	-
K9 Antibiotics can cause side effects (allergies, diarrhoea, vomiting).	27(68)	9 (23)	4 (10)
K10 Antibiotic resistance is the loss of sensitivity of antibiotic to a specific bacterium	8 (20)	6 (15)	26 (65)

Attitude towards antibiotic resistance

The results showed that the community pharmacists had positive attitude towards resistance issue. They got a total mean attitude score of 22.5. Our study highlighted that there were only 15 pharmacists who considered antimicrobial resistance as a serious issue and 30 pharmacists agreed that tackling the resistance issue is solely the responsibility of

doctor/physician. Many pharmacists (n=30) agreed that, patients demanding an antibiotic without prescription should be requested to consult a physician first. There were also some pharmacists (n=25) who agreed that there is no need for the patients to visit a physician for minor infections, and of opinion that antibiotic can be dispensed to them without a prescription.

Table 3: Community pharmacists' attitude towards antibiotic resistance

Statement	SA n (%)	A n (%)	NAD n (%)	D n (%)	SD n (%)
A1 ABR have become a serious issue all over the globe	4 (10)	11(28)	19(48)	1 (3)	5(13)
A2 It is the responsibility of pharmacist to educate patients on proper use of antibiotics	11(28)	15(38)	13(33)	-	1 (3)
A3 New antibiotic development can solve antibiotic resistance issue	5 (13)	11(28)	21(53)	-	3 (8)
A4 Antibiotics can be dispensed without prescription	2 (5)	18(45)	2 (5)	6(15)	12(30)
A5 Patients should be requested to consult physician before dispensing an antibiotic without prescription	7 (18)	28(70)	1 (3)	1 (3)	3 (8)
A6 Patient with minor infections (pharyngitis, diarrhoea etc.) need not consult a physician for an antibiotic, it can be dispensed without prescription by a pharmacist	-	25(63)	1 (3)	5(13)	9 (23)
A7 Tackling ABR is solely the responsibility of physicians	5 (13)	25(63)	10(25)	-	-

Note: SA-strongly agree; A- agree; NAD- neither agree nor disagree; D- disagree; SD- strongly disagree

Dispensing practice of antibiotics

All the 40 participants gave their responses to 6 questions regarding dispensing practice of antibiotics. The pharmacists got a mean score of 20.6 indicating poor antibiotic dispensing practice. Even though many pharmacists agreed that, patients demanding an antibiotic without prescription should be requested to consult a physician first, we could note that a high

number of pharmacists dispense antibiotics without a prescription. Around 26 pharmacists dispense antibiotics to treat minor ailments without a prescription. This malpractice was also seen in many other countries where many pharmacists dispensed antibiotics without prescription [22-25]. This indicates lack of stringent laws regarding non-prescription sale of antibiotics paving way to the pharmacists to do so.

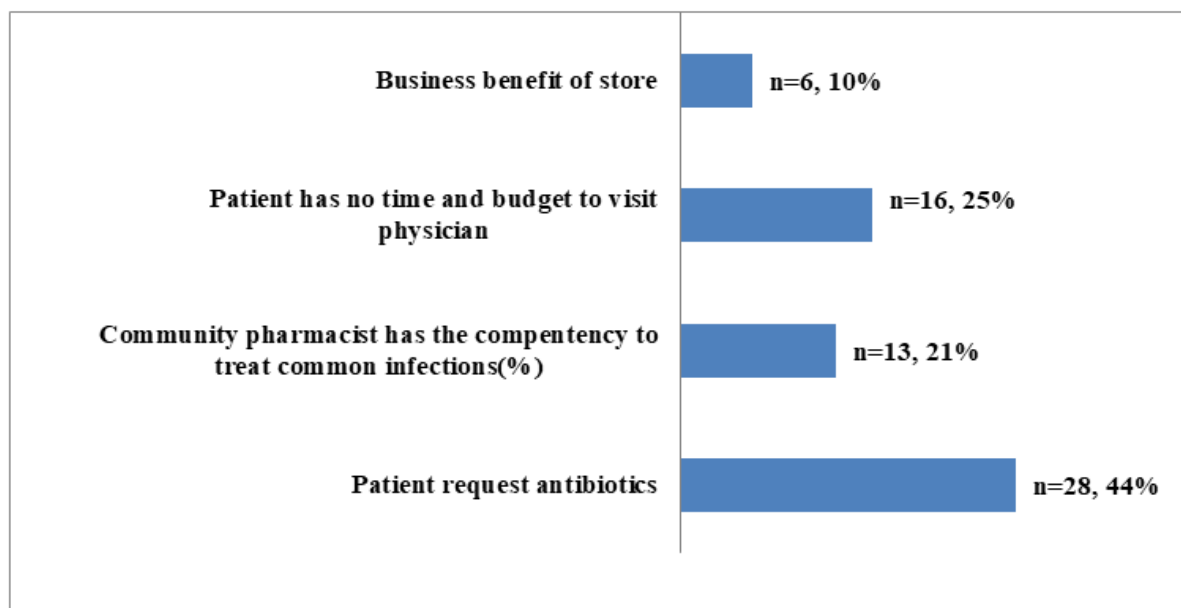
Table 5: Antibiotic dispensing practices by community pharmacists

Statement	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)
P1 I educate the patient on when and how to take the antibiotic	5 (13)	4 (10)	6 (15)	3 (8)	22 (55)
P2 I educate the patient about minor side effects of antibiotics	19(48)	3 (8)	7 (18)	5 (13)	6 (15)
P3 I dispense antibiotics without prescription if the patient requests an antibiotic	11(28)	6 (15)	11 (28)	5 (13)	7 (18)
P4 I dispense the antibiotics to known patients, without prescription	9 (23)	7 (18)	11 (28)	7 (18)	6 (15)
P5 I dispense antibiotics to treat minor ailments in patients without prescription	12(30)	2 (5)	11 (28)	8 (20)	7 (18)
P6 I inform the patient that misuse of antibiotics can lead to antimicrobial resistance	29(73)	1 (3)	4 (10)	4 (10)	2 (5)

Our results regarding non-prescription sale of antibiotics was better when compared with the study done in New The pharmacists were asked questions on most commonly encountered infections in their community pharmacy, most commonly dispensed antibiotics, reasons for dispensing antibiotics without prescription and maintenance of register for SchI antibiotics.

All the 40 respondents answered to all 4 questions regarding current situation in community pharmacy practice. Respiratory infections were the most common. Penicillin group of antibiotics were the most commonly dispensed antibiotics (n=35,38%) followed by cephalosporins (n= 33,36%) and macrolides (n= 15,16%).Patient requests the antibiotics was the most common reason given by the respondents (n= 28,44%). The other common reason was that the patient has no time and budget visit a physician (n=16,25%). This could be due to the high fees of the

doctor, treatment cost and lack of awareness about antimicrobial resistance among the general public. In India to prevent the sale of important antibiotics without prescription, the Central Drugs Standard Control Organisation (CDSCO) implemented Schedule H1. The Schedule H1 list contain antibiotics such as third and fourth generation cephalosporins, anti TB drugs and newer fluoroquinolones. The drugs mentioned in the Schedule H1 should be dispensed only with a prescription from a registered medical practitioner and the pharmacist must maintain a separate register with patient's name, contact details of the prescribing physician and the name and dispensed quantity of the drug. The register has to be retained for at least 3 years and is subject to audit by the government [14]. Our results showed that, not all pharmacists maintain a Schedule H1 register Data collected from 40 community pharmacies showed that 23(58%) community pharmacies maintained a register for Schedule H1 antibiotics.

**Figure 1: Reasons for dispensing antibiotics without prescription**

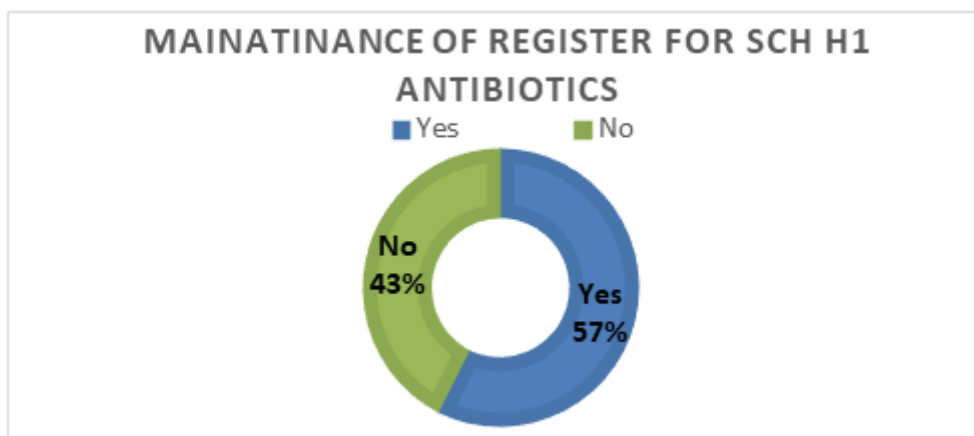


Figure 2: Community pharmacists maintenance of register for Sch H1 antibiotics

Community pharmacists' level of knowledge, attitude and practice on antibiotics and resistance

Among the 40 community pharmacists interviewed, 18(40%) had good knowledge on antibiotics and resistance. In case of attitude, 23(58%) showed good attitude towards resistance state. Only 19 (47%) pharmacists showed good antibiotic dispensing practice. Figure 3 shows the level of knowledge, attitude and practice of community pharmacists.

Community pharmacists' demographics associated to knowledge, attitude and practice in antibiotics and resistance

The demographics of community pharmacists associated to their knowledge, attitude and practice on

antibiotic and resistance was determined using statistical tests i.e., Kruskal Wallis test and Chi square test. The Kruskal Wallis test analysis of knowledge data results showed that there was significant association for age ($p=0.04$) and educational degree ($p=0.01$) of community pharmacists. Pharmacists with the age group of 30-40 years had good knowledge compared to other groups and M. Pharm group showed good knowledge when compared to other groups. There was statistically significant association between attitude and age ($p=0.016$). Refer table number 5. The results of Chi square test showed that educational degree affects the attitude ($p=0.006$) Significant association was also found for practice and educational degree ($p=0.005$).

Table 5: Community pharmacists demographics associated to knowledge, attitude and practice scores

Demographics		Knowledge			Attitude			Practice		
		Median score	Mean rank	p-value	Median score	Mean rank	p-value	Median score	Mean rank	p-value
Age (years)	<30	4	20.2	0.04	25.5	27.5	0.016	19	35.6	0.56
	30-40	5	26.2		20	16.3		18	36	
	>40	3	12.9		20	16.8		23	24	
Educational degree	D. Pharm	3	15.4	0.01	20	30	0.39	16	15.3	0.16
	B. Pharm	4	19.7		22	42.1		20	21	
	M. Pharm	5.5	29.4		23.5	36.5		25	26.2	
Working experience (years)	< 5	4	17.7	0.47	21	17.6	0.48	18	17.5	0.45
	5-10	4.5	23.9		24	22.4		22	20.6	
	>10	4	20.3		22	22.1		23	21.7	

Note: $p < 0.05$ is statistically significant

Table 6: Knowledge, attitude and practice scores of pharmacists and non-pharmacists

KAP	Pharmacist			Non-pharmacist			
	Mean	SD	Median	Mean	SD	Median	p-value
Knowledge	4.37	1.5	4	3.18	1.8	3	0.07
Attitude	22.5	3.7	22	21.4	3.2	22	0.36
Practice	20.6	5.7	20	15.8	1.8	15	0.005

Even though the data of non-pharmacists were excluded but still their responses were scored. The results showed that the non-pharmacists had poor

knowledge (score=3.18), good attitude (score=21.4) and poor dispensing practice of antibiotics (score= 15.8) Refer table number 6.

However, both the pharmacists and non-pharmacists scored less in knowledge and attitude section. We applied t-test to determine significant difference between the scores of the pharmacists and non-pharmacists. Significant difference was found in the practice section ($p=0.005$). Pharmacists showed better antibiotic dispensing practice compared to non-pharmacist.

CONCLUSION

The study showed that the community pharmacists had poor knowledge on antibiotics and antibiotic resistance as well as poor antibiotic dispensing practice. Our study highlights that there is need for the community pharmacists to update their knowledge and improve their awareness on antibiotic resistance. Pharmacy associations should conduct short term, intensive training programmes to improve their knowledge on antibiotic resistance and to practice good antibiotic dispensing by the pharmacists. The community pharmacists should be provided with booklets, pamphlets, e- material, webinars to enhance their knowledge on infectious diseases, antibiotics and its proper dispensing. Strict laws and strategies are need to be implemented to change the practice of dispensing antibiotics without prescription and reduce the demand of non- prescription antibiotics by the customers. Regular inspections by the government officials should be done in order to ensure and identify this malpractice. Measures should be taken by the pharmacy associations to stop the pharmacy operation without qualified pharmacists.

These findings will help in planning educational strategies to improve the awareness of antimicrobial resistance among the community pharmacists. The limitation is that, the study was done using self-administered questionnaire and the major disadvantage of self- administered questionnaire is bias, over or under reporting of responses by the respondents. Despite of the limitation our findings provide important information for evaluating and improving community pharmacists' knowledge, attitude and practice on antibiotics and resistance.

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