

Assessment of Knowledge, Attitude and Practice towards Dispensing of Antibiotics and Over the Counter Drugs among Community Pharmacists in Guntur, Andhra Pradesh

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ABSTRACT

Aim: To assess the knowledge, attitude, and practice (KAP) concerning dispensing pattern of antibiotics and OTC medication among the retail dispensers in community pharmacies. **Materials and Methods:** A cross-sectional study was performed from March 2021 to August 2021. Simulated patient (SP) based face-to-face interviews were conducted with validated structured questionnaires. **Results:** During our interview, we noticed only 60% of registered pharmacists (RPs) and 40% of non-RPs were working in community pharmacies. Among the RPs, 35 were D.Pharm and 62 were B.Pharm graduates. The average correct answer to antibiotic questionnaires provided by dispensers with D.Pharm (39.2%), B.Pharm (47.7%) and Non-Pharmacists (38.4%). Among the respondents, the KAP against antibiotic questionnaires No. 1 and 4 are statistically significant ($p < 0.05$). Similarly, 44.5% of D.Pharm, 56.6% of B.Pharm and 42.2% of Non-Pharmacists responded to OTC questionnaires. The OTC questionnaire No. 1, 4 and 7 are not statistically significant ($p > 0.05$) among responders. **Conclusion:** In our findings, 40% of non-Pharmacists were running the pharmacies. On an average, they have less than 50% of KAP towards antibiotics and OTC medications among pharmacists and non-pharmacists. To overcome this, pharmacists should undergo need continual professional development programs and non-pharmacist must require a formal pharmacy education.

Keywords: Over-the-counter, Pharmacy Practice, Simulated patient, Self-medication, South India.

INTRODUCTION

The preponderance of bacterial resistance to antibiotics is a global public health issue.¹⁻² Since their discovery in the 20th century, antibiotics have saved countless lives.³ Patients are often bypassing the health care system and acquiring medications via community pharmacies,⁴ for minor cough and cold symptoms without prescription.⁵ Nevertheless, its misuse, either by patients or healthcare professionals are a significant contributor to antimicrobial resistance,⁶ and provokes more prevalent of adverse

drug reactions.⁷ Infectious diseases are one of the leading causes of mortality in developing countries,⁸ because there are no strict regulations governing the dispensing of antibiotics by community pharmacies.⁶ The reasons for this predicament are community pharmacies are the first choice for many people with health problems, particularly in middle- and low-income countries⁹ because, they are easily accessible at low price and provide quick service.¹⁰ As a result, over time, a large number of medications were liberalized and made available as over-

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the-counter (OTC) medications.¹¹ In India, the self-medication was more common in rural¹² and urban¹³ areas, with rates ranging from 32.5% to 81.5% respectively. OTC drugs also known as nonprescription drugs, are a class of medications. Those that can be purchased without a prescription from a registered medical practitioner and are regulated by the Food and Drug Administration (FDA) via an OTC drug monograph.¹⁴ Pharmacists must retrieve the patient's medication history interview and medical history interview in order to provide comprehensive pharmaceutical care. There was always a genuine risk of misuse when there was no patient counselling.¹⁵ The International Pharmaceutical Federation (FIP)¹⁶ and Indian Pharmaceutical Association (IPA)¹⁷ developed good pharmacy practice (GPP) guidelines. These policies and procedures govern pharmacists' roles and responsibilities. Pharmacists should be able to advise patients on the proper selection and use of OTC medications as well as other antibiotic medications. Community pharmacists, however, do not strictly adhere to these guidelines. Hence, in view of the importance of judicious use of these drugs, we are aimed to conduct a cross-sectional study to assess the KAP concerning dispensing pattern of antibiotics and OTCs among the south Indian community pharmacists.

MATERIALS AND METHODS

Study Design and Site

A cross-sectional study was conducted during November 2020 to March 2021, to assess community pharmacist's knowledge, attitude, and practice regarding dispensing of antibiotics and over-the-counter medications in rural and urban areas of Guntur, India.

Sampling, data collection and technique

A total of 161 retail pharmacies in rural and urban areas of Guntur, Andhra Pradesh, India, were chosen randomly, based on prescription volume and busy retail pharmacies. The information was gathered through face-to-face interviews and structured questionnaires.

Before the interview, five intern Pharm D students are trained and instructed to pose as simulated patients (SPs) in order to retrieve data from community pharmacy dispensers. To avoid study bias, the purpose of our study was not revealed to responders until the interview was completed. The purpose of the interview was explained to the participants following the interview. The copies of the questionnaire responses were given to the responder; one signed copy was kept by the interviewer and signed by the responder.

Simulated Patient

In pharmacy practice research, patient simulation is a common method.¹⁸ A simulated patient (SP) is a well-trained actor who takes on the role of a real-life scenario. They will test the pharmacy staff's responses by asking for suggestions or advice on medications or health.¹⁹

Preparation of Questionnaire

Considering the previous literatures,²⁰⁻²¹ a separate questionnaire for antibiotics and OTCs were developed and validated to assess KAP among dispensers. There are seven questionnaires about antibiotics, and twelve related OTCs. The questionnaires on antibiotic and OTC knowledge were graded using "Yes" or "No" responses. Attitude questionnaires were designed to assess the dispenser's level of attitude and which was graded on five-point Likert-scale. The responses were; strongly disagree, disagree, not sure, agree, and strongly agree. Each correct answer carries "1" point while every wrong answer count "0". The responses were consolidated and average values are used to compare the association between KAP among the D.Pharm, B.Pharm and Non-Pharmacists. The responses were aggregated, and the average values were used to compare the association of KAP among D.Pharm, B.Pharm, and Non-Pharmacists.

Statistical analysis

SPSS version 18.0 software was used to enter and analyze the auricled data (SPSS Inc., Chicago, IL, USA). Descriptive statistics, frequencies, and percentages were used to summarize the data. The Chi-square test was used to assess the relationship between demographic characteristics and KAP practices. A statistically significant *p*-value of less than 0.05 was considered.

Ethical approval

The study protocol was approved by Institutional review board (IRB/VPC/2020/34) of Vignan Pharmacy College, Guntur, India. The study was conducted, in accordance with the principles of good clinical practice guidelines.

RESULTS

The simulated pharmacists were interviewed at 161 community pharmacies in both rural and urban areas Guntur, India. During the interview, we noticed the physical presence of 97 registered pharmacists (RP) selling drugs and 64 (39.7%) were non-pharmacists of drug sellers in community pharmacies (other than those with a pharmaceutical education background).

In 64 community pharmacies, there was no physical presence of a registered pharmacist (RP). Furthermore, they are unwilling to have their name and educational qualifications tarnished. The pharmacy educational background was found to be 35 (36 %) Diploma in Pharmacy (D.Pharm) holders and 62 (64 %) Bachelor of Pharmacy (B.Pharm) holders among the 97 RPs selling the drugs at the time of interview. There were 4% (07) of women selling drugs in community pharmacies (Table 1). In addition, our simulators were interviewed using a questionnaire-based interview to assess their knowledge, attitude, and practice (KAP) regarding antibiotic use. During the interview, 7 validated questionnaires were used to assess the KAP of antibiotics. The responses to questionnaires 1 and 4 showed a very strong association ($p < 0.05$) between the drug sellers (D.Pharm, B.Pharm and Non-Pharmacy). Which indicates that RPs with B. Pharm degrees are more likely to respond correctly (69.3%) than D. Pharm and non-pharmacists. Approximately 70-78% of RP and non-pharmacists sell antibiotics based on patient willingness/requirement (questionnaire No.3). Similarly, the responses to questionnaires 2, 5, 6, and 7 were not significant ($p > 0.05$) among the respondents (Table 2, Figure 1). Our SPs assessed drug sellers' attitudes toward the dispensing of OTC drugs in community pharmacies. The interview was

conducted using 12 validated questionnaires (Table 3, Figure 2). The majority of respondents (65-69%) are unaware of OTCs (Q. No. 1). OTCs are assumed to be less effective than prescription drugs by RPs (25.7 % of D. Pharm, 35.5 % of B. Pharm) and 40% of non-

Table 1: Demographic details of the responders N=161, (%).

Sl. No	Parameters	N=161 (%)	P Value
1.	Pharmacists revile their specialization		
	Yes	97 (59.6)	0.0174*
	No	64 (40.4)	
2.	Pharmacists revile to give their name		
	Yes	148 (91.9)	< 0.0001*
	No	13(8.1)	
3.	Level of Education		
	Pharmacy graduates	97 (60.3)	0.0107*
	Non- pharmacy candidates	64 (39.7)	
4.	Gender		
	Men	154 (95.7)	< 0.0001*
	Women	07 (04.3)	

*The P value <0.05 were considered statistically significant

Table 2: Assessment of KAP related to antibiotics among the responders.

S.No	Category of questionnaire on Antibiotics	D.Ph N=35 (%)	B.Ph N=62 (%)	Non-Ph N=64 (%)	P Value
1.	Do you sale antibiotics with prescription				
	Yes*	19 (53)	43(69.3)	28 (43.7)	0.0013**
	No	16 (47)	19 (30.7)	36 (56.3)	
2.	Do you aware, that the antibiotics are not to be dispensed as OTC				
	Yes*	26 (74.3)	50 (80.6)	47 (73.4)	0.5642
	No	09 (25.7)	12 (19.4)	17 (26.6)	
3.	Do you dispense antibiotics is based on patient's interest/ patient willing				
	Yes	25 (71.4)	46 (74.2)	50 (78.5)	0.6117
	No*	10 (28.6)	16 (25.8)	14 (21.5)	
4.	Does antibiotics are essential and effective in common cold and cough				
	Strongly disagree*	09 (25.7)	31 (50)	16 (24.6)	<0.0001**
	Other than Strongly disagree (Agree/Disagree//Strongly agree/Don't Know)	26 (74.3)	31 (50)	48 (75.4)	
5.	Does antibiotics destroy the normal gastric flora				
	Strongly agree*	11(31.4)	21 (33.9)	23 (35.4)	0.8232
	Other than Strongly agree (Agree/Disagree/Strongly disagree/ Don't Know)	24 (68.6)	41 (66.1)	41 (64.6)	
6.	Do you agree that the misuse/Indiscriminate use of antibiotics can cause resistance				
	Strongly agree*	10 (28.6)	26 (42)	20 (30.8)	0.1134
	Other than Strongly agree (Agree/Disagree/Strongly disagree/ Don't Know)	25 (71.4)	36 (58)	44 (69.2)	
7.	Do you aware, antibiotics could cause side effects				
	Yes*	11 (31.4)	20 (32.2)	24 (36.9)	0.6281
	No/Don't Know	24 (68.6)	42 (67.8)	41 (63.1)	

* Reference and correct answer; **The P value <0.05 were considered statistically significant

Table 3: Assessment of KAP related to OTC medications among the responders.

S.No	Category of questionnaire on OTC	D.Pharm N=35 (%)	B.Pharm N=62 (%)	Non-Phar N=64(%)	P Value
1.	Do you dispense OTC drugs for minor ailments				
	Yes*	12 (34.3)	22 (35.5)	20 (30.8)	0.7534
	No	23 (65.7)	40 (64.5)	44 (69.2)	
2.	Do you dispense OTC medications for major ailments (B.P, Diabetes, CVS problems)				
	Yes	18 (51.4)	32 (51.6)	62 (95.4)	<0.0001**
	No*	17 (48.6)	30 (48.4)	02 (04.6)	
3.	Is there be any age restriction for obtaining OTC				
	Yes	23 (65.7)	22 (35.5)	53 (81.5)	<0.0001**
	No*	12 (34.3)	40 (64.5)	12 (18.5)	
4.	Do you feel OTC drugs are less effective than prescription drugs				
	Yes	26 (74.3)	40 (64.5)	39 (60)	0.0999**
	No*	09 (25.7)	22 (35.5)	26 (40)	
5.	Do you think OTC drugs encourage self-medication among patients				
	Yes*	12 (34.3)	37 (59.7)	41 (63.1)	<0.0001**
	No	23 (65.7)	27 (43.5)	24 (36.9)	
6.	Are you concerned about the misuse of OTC				
	Yes*	10 (28.6)	32 (51.6)	45 (69.2)	<0.0001**
	No	25 (71.4)	30 (48.4)	20 (30.8)	
7.	Do over-the-counter drugs cause addiction				
	Yes	17 (48.6)	23 (37.1)	34 (52.3)	
	No*	18 (51.4)	39 (62.9)	31 (47.7)	0.0622
8.	Before dispensing the OTC drugs do you take any patient medication history interview/medical history				
	Yes*	12 (34.3)	37 (59.7)	41 (63.1)	<0.0001**
	No	23 (65.7)	25 (40.3)	24 (36.9)	
9.	Do you give any patient counseling after dispensing of OTC drugs				
	Yes*	14 (40)	35 (56.5)	38 (58.5)	0.0214**
	No	21 (60)	27 (43.5)	27 (41.5)	
10.	Are you aware of possible drug interactions of OTC with other concomitant use of medications				
	Yes*	25 (71.4)	34 (54.8)	34 (52.3)	0.0042**
	No	10 (28.6)	27 (43.5)	31 (47.7)	
11.	Does increase dose of OTC can be unsafe/dangerous				
	Yes*	27 (77.1)	56 (90.3)	17 (26.2)	<0.0001**
	No	08 (22.9)	06 (09.7)	48 (73.8)	
12.	Do you update your knowledge regarding OTC drugs/ other medications/ attend any modules/CPD programm				
	Yes*	19 (54.3)	37 (59.7)	17 (26.2)	<0.0001**
	No	16 (45.7)	25 (40.3)	48 (73.8)	

* Reference and correct answer; **The P value <0.05 were considered statistically significant

Pharmacist drug sellers (Q. No. 4). A 47.63 percent of respondents have an opinion about OTCs, which can lead to addiction (Q. No. 7). However, the response trend among respondents (for questionnaires 1, 4, and 7) is statistically insignificant ($p > 0.05$). Non-Pharmacists (95%) and RPs (50%) are dispensing the drugs for major ailments such as diabetes, blood pressure, dyslipidemia,

and other cardiovascular diseases (Q. No.2). 81.5% of non-pharmacist respondents and 65.7% of D. Pharm respondents are restricted from dispensing OTCs. Almost half of the respondents did not obtain the patient medication history interview/medical history prior to dispensing OTCs (Q. No. 3). Before dispensing OTCs, 80 (49.7 %) of respondents retrieved the patient

Table 4: The overall average correct response among the responders.

Responder	KAP on	Correct Response (%)	Wrong Response (%)	P Value
D.Pharm	Antibiotics	39.2	60.8	0.421
B.Pharm*	Antibiotics	47.7	52.3	
Non-Pharma	Antibiotics	38.4	61.6	0.293
D.Pharm	OTCs	44.5	55.5	0.254
B.Pharm*	OTCs	56.6	43.4	
Non-Pharma	OTCs	42.2	47.8	0.107

* Reference

The P value <0.05 were considered statistically significant

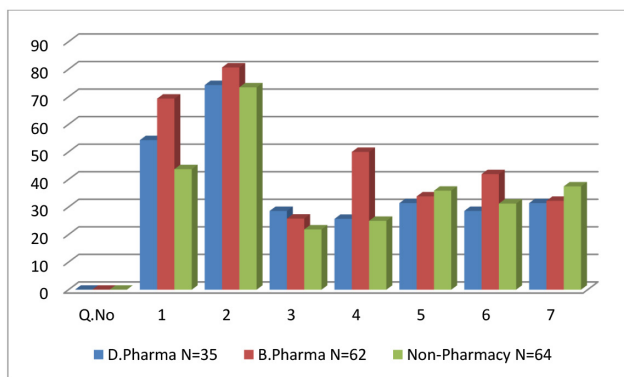


Figure 1: Question wise response on KAP related to antibiotics among the responders.

medication history interview/medical history. That practice is carried out by 61.3 percent of non-Pharmacists, 59.7 % of B. Pharm, and 34.3 percent of D. Pharm. Surprisingly, Non-Pharmacists outperformed D. Pharm (Q. No.8). The responses to questionnaires 2, 3, 5, 6, and 8-12 were statistically significant ($p < 0.05$). Responders, on the other hand, require continuous professional development (CPD) programs and strong formal pharmacy education to rationally dispense drugs, and non-Pharma responders require formal pharmacy education to practice as pharmacists. The overall average correct response among respondents was found to be insignificant ($p > 0.05$) (Table 4, Figure 3). Furthermore, their average KAP response to antibiotics and OTC medication dispensing was typically less than 50%. As a result, regulatory bodies have become more vigilant in order to improve rationality and proper pharmaceutical care.

DISCUSSION

Currently, antibiotics are now widely available as OTC in many community pharmacies. This, in turn, causes

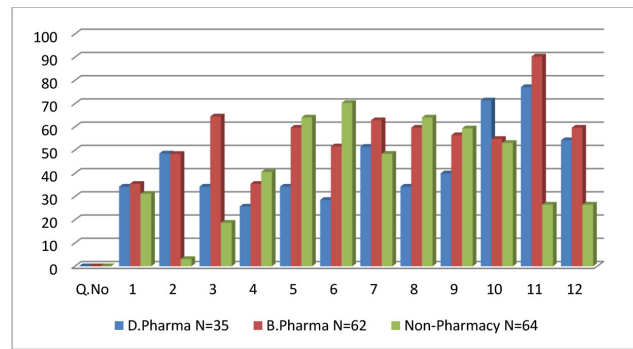


Figure 2: Question wise response on KAP related to OTC medications among the responders.

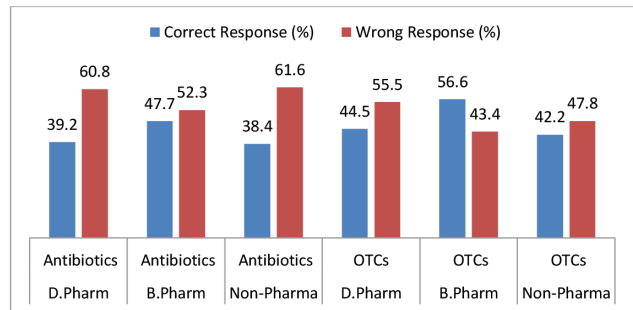


Figure 3: The average % of response on KAP of Both Antibiotics and OTC drugs among the responders.

bacterial resistance and a global health problem.²² As a result, judicial sale of antibiotics may help to reduce antibiotic resistance. Regardless, they should only sell with a valid prescription.²³ Despite this, these drugs are frequently requested and dispensed to patients without a prescription in many parts of India, with the practice being more prevalent in developing and economically poor countries.²⁴ The KAP on antibiotics among dispensers is dubious. As a result, we intend to assess the KAP among South Indian dispensers. According to the findings of our study, nearly half of all antibiotics sold as OTC in our community pharmacies. Despite the fact that they are aware (80%) that it should not be dispensed as OTC. 70% of RPs with a B. Pharm qualification are serving antibiotics with a valid prescription. Its global prevalence was 62.2 percent.²⁴ Descriptively, its prevalence was 94.3%²⁵ in India, 97.9% in Saudi Arabia, and 90.9 % in Indonesia.^{26,27} In the Chinese community, antibiotics are sold as OTC without a prescription 86.8 % of the time online and 79 % of the time off line.²⁸ In our study, the overall average response of KAP to antibiotics was < 40% of those who responded. It was 30% in Saudi Arabia community pharmacies,²⁹ where all pharmacists are qualified, in Chinese scenario, 94.9 % of RPs were knowledge about antimicrobial use. However, 40.6% of RPs was selling the antimicrobials to patients without a prescription.³⁰ To avoid antibiotic

misuse and antibacterial resistance, immediate and stringent corrective measures are required to improve antibiotic dispensing practices in Indian community pharmacies. The Drugs and Cosmetics Act and Drugs and Cosmetics Rule in India categories medicines into various schedules. Drugs listed in Schedules H, H1, and X should bear a label stating that these drugs are to be sold by retail only on prescription of a registered medical practitioner.³¹ Unlike in other developed countries, the phrase “OTC” had no legal definition or recognition. The drugs are referred to and used as self-medication or without a prescription, or pharmacists are authorized to sell them without a prescription from a registered medical practitioner. Hence, it should be cautiously dispensed by the RPs. The results of KAP on dispensing OTC showed that the average KAP ranged from 42 % to 56.6 % among the dispensers. Dispensing medications other than minor ailments to patients without a prescription is practiced by 51-56 % of RPs and 95.4 % of Non-Pharmacy candidates. This has a significant impact on public health. The overall prevalence of self-medication practices in India was 52%,³² which was nearly identical with our results. In India, Self-medication was more common in rural¹² and urban¹³ areas with ranges from 32.5% to 81.5%. The prevalence in various Indian province of India was 81% in Maharashtra.¹² In rural Tamil Nadu,³³ the prevalence was only 23%, and in Berhampur, Odisha, it was 18.7%.³⁴ There was adequate public and RP awareness in these states. The prevalence of self-medication was much higher in urban Delhi, at 92.8 percent.³⁵ Patient counselling during the sale of OTCs by dispensers ranged from 40% to 58.5 percent in our study. Non-Pharmacy individuals are more effective at counselling (58.5 %) than RPs. Nonetheless, this was a poor pharmaceutical care practice, and our findings supported a previous study conducted in India. Although 96.5 % of RPs inquired about patient complaints prior to dispensing OTC medications, only 51 % of the overall 90 % of RPs provided medication counselling and instructions.³⁶ Providing satisfactory information to patients regarding medication is vital part which may reduce the drug related problems. Health care professionals should apprise their current knowledge, in order to deliver the best quality of pharmaceutical care service to the patients. The continuing professional development programs are the one, which will help to improve their competence and to optimize patient care. In our study, 40%-45% of RPs was not involving in CPD programs for updating their current knowledge. It may be due to lack of awareness, time and or resources.³⁷⁻³⁸ The CPD is a lifelong learning and it requires a realistic, relevant, and mandatory for the Indian RPs.

CONCLUSION

Our simulated patient's confiners, 40% of non-Pharmacists were operating the pharmacies without presence of registered pharmacist. Dispensers are having less than 50% of KAP on sale of antibiotics and OTC medications. Hence, to provide high level of pharmaceutical care service, it requires some interventions such, education, awareness comparing about misuse of antibiotic and OTC medications, legislation and enforcement are urgently needed to promote judicious sale of antibiotics and OTC medication among the community pharmacies. The licensed pharmacists are needed to attend the continual professional development programs and non-pharmacist must require a formal pharmacy education.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

B. Pharm: Bachelor of Pharmacy; **CPD:** Continuing professional development; **D.Pharm:** Diploma in Pharmacy; **FDA:** Food and drug administration; **GPP:** Good pharmacy practice; **KAP:** Knowledge, Attitude and Practice; **OTC:** Over the counter; **Pharm-D:** Doctor of Pharmacy; **RP:** Registered Pharmacist; **SP:** Simulated patient.

SUMMARY

Community pharmacists require ongoing professional development in order to provide effective pharmaceutical care to patients, including the sale of OTC and antibiotics. Most community pharmacies are run by non-pharmacists, which necessitates strict vigilance by regional drug control authorities, as well as the physical presence of a registered pharmacist in community pharmacies at all times.

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