



STUDY OF OVER THE COUNTER SALE OF ANTIMICROBIALS IN PHARMACY OUTLETS IN PUNE, INDIA: A CROSS SECTIONAL STUDY

S.D. SALUNKHE*, V.A.PANDIT , J.S.DAWANE ,
K.D.SARDA AND C.S.MORE .

Department of Pharmacology, Bharati Vidyapeeth Medical College, Pune-411043

ABSTRACT

Inappropriate use of antimicrobials (AMAs) is a worldwide problem, leading to increasing treatment costs, adverse events and emergence of antibiotic resistant organisms. Self medication, over the counter sale of antimicrobials are some reasons of irrational use of AMAs. Restricting antibiotic use, marketing regulations are important strategies to control this problem. Over the counter sale of AMAs is rarely a focus of study in India. Therefore the present study was aimed to determine the percentage of pharmacies who sale antibiotics without prescriptions involving 263 pharmacies in Pune. Simulated Client Methodology: To obtain AMAS investigator posed as suffering from sore throat or acute diarrhoea. Three levels of demand were used to convince the pharmacists to sell antibiotics. Antibiotics were dispensed in 248 pharmacies. Sore throat & diarrhoea resulted antibiotics dispensed in 123 (92.48%) & 125 (96.15%) cases respectively. Azithromycin 63 (51.21%), Norfloxacin 40 (32%) were commonly given for sore throat & diarrhoea respectively. Pharmacies dispensed AMAs in correct dose and duration for sore throat in 64.22% & for acute diarrhoea in 10.4% cases. Only 2% pharmacies asked about allergy history & 8% recommended for physicians advice. Conclusion: Dispensing antimicrobials without prescription is high in Pune. Most AMAS were dispensed in wrong dose and duration. Health education programmes should be directed to pharmacists & general population.

KEYWORDS: Antibiotic resistance, Inappropriate use, OTC sale of AMAs, Pharmacy outlets.



S.D. SALUNKHE

Department of Pharmacology, Bharati Vidyapeeth Medical College, Pune-411043

*Corresponding author

INTRODUCTION

Antibiotic sales without medical prescriptions have been observed in many countries¹⁻³. This exacerbates the existing worldwide problem of inappropriate use of antibiotics that leads to an increase in treatment cost, adverse drug effects and antibiotic resistance⁴. Antibiotic resistance is a global health problem, closely related to volume of antibiotic consumption^{5, 6}. Outpatient use of antibiotics accounts for more than two-thirds of antibiotic sales in the world. Most initiatives regarding antibiotic misuse are directed toward optimizing physicians' prescriptions⁷⁻⁹, while other potential sources of antibiotic misuse are neglected. Presently in India, Schedule H, under the Drug and Cosmetics Act and Rules, has provided a list of over 536 drugs, including antibiotics, which are required to be sold on the prescription of a registered medical practitioner and the manufacturer is required to label the drug with the symbol Rx and with the following words: "Schedule H drug - warning: To be sold by retail on the prescription of a Registered Medical Practitioner only"¹⁰. The Lancet, in a recently published article about the 'Superbug', has insinuated that the large scale antibiotic misuse in India has resulted in many strains of bacteria becoming resistant to many antibiotics⁴. In response, the Government of India has created a committee to frame a new antibiotic policy for the country. The antibiotic policy which has been written by this committee is Schedule HX which is currently under review by the Union Law Ministry, after which it will be reviewed by the Drugs Technical Advisory Board¹¹. Studies which have been conducted across various parts of the world have shown that AMAs could be obtained easily from local pharmacies despite the regulations¹²⁻¹⁴. In many African, Asian and Latin American countries, antibiotics are readily available on demand from pharmacies, drug stores, roadside stalls and hawkers¹⁵. Clinical scenarios presented in this study such as acute sore throat and diarrhea are frequently viral syndromes and self-limiting. There is no evidence that antibiotic use offers any advantage in the treatment of these syndromes when the probability of bacterial infection is low. Treatment with antibiotics is generally not recommended when symptoms have only been

present for one or two days and the probability of bacterial infection is also low in the absence of high fever^{16,17}. Countries with the most reserved antibiotic-prescribing patterns have relatively lower rates of antibiotics resistance¹⁸. It is widely believed that antimicrobial agents are available over the counter in most of the parts of India. Restricting antibiotic use and marketing regulations are among many important strategies to control this problem¹⁹. Therefore this study was planned to evaluate the availability of antimicrobial agents without prescriptions. The objectives of the present study are 1) To determine the number of pharmacies selling antimicrobials without prescription. 2) To learn which antimicrobials are sold without prescription. 3) To describe the degree of difficulty in procurement of antimicrobials. 4) To evaluate rationality of dispensing antimicrobials in terms of dose and duration. We hope to provide data about the availability and the ease/difficulty which is faced in the availability of AMAs without prescriptions.

MATERIALS AND METHODS

A cross sectional, observational study of a random sample of 263 pharmacies was conducted in Pune during March 2012 to August 2012. The sample was intended to be representative of all Pune pharmacies. The sample was stratified by the five regions of Pune (Eastern, Western, Northern, Southern, Central). A convenience sample of randomly selected pharmacies from one of two major streets was chosen from each region and a complete enumeration of all pharmacies in selected street was considered. Each pharmacy was visited once by investigators who simulated having/suffering clinical scenario according to simulated-client method pharmacy surveys^{20, 21}. In present study included clinical scenarios are sore throat & acute diarrhea. The investigators concealed their identity. Immediately after leaving the pharmacy, investigators completed a standardized data form that included information about the location of the pharmacy, antibiotics dispensing practice, pharmacists' inquiries about associated

symptoms, allergy history; type of antibiotic, if dispensed; and advice to see a physician if this was provided by the pharmacist. Any one of two different well rehearsed clinical scenarios presented in a pharmacy was randomly allocated. Only the following clinical information was presented to the pharmacist. Any additional information was provided only if the pharmacist inquired about it.

Sore throat scenario: Pain in throat, fever for one day duration.

Acute Diarrhea scenario: Four to five loose stools, weakness and slight fever for one day.

Four levels of demand were used by investigators sequentially until an antibiotic was dispensed or denied³:

Level 1: Can I have something to relieve my symptoms?

Level 2: Can I have something stronger?

Level 3: I would like to have an antibiotic.

Level 4: Pharmacist refused to dispense an antibiotic.

Data are presented as percentage of the pharmacists' responses toward the simulated clinical scenarios. The study was approved by the Institutional Ethical Review Board. Deception and incomplete disclosure to study subjects (pharmacists) were considered ethically acceptable because this was a minimal risk study and it could not have been performed with complete disclosure of

investigator entity. Data were kept anonymous.

RESULTS

From the randomly selected two hundred sixty three (263) pharmacies from all five regions of Pune (Eastern, Western, Northern, Southern, Central), antibiotics were dispensed without medical prescription in 248 (94.65%) with different levels of demand. Investigators simulated clinical cases for sore throat and diarrhea as described in methodology, in 133 and 130 pharmacies accounted for antibiotics dispensed in 123 (92.48%) & 125 (96.15%) cases respectively.

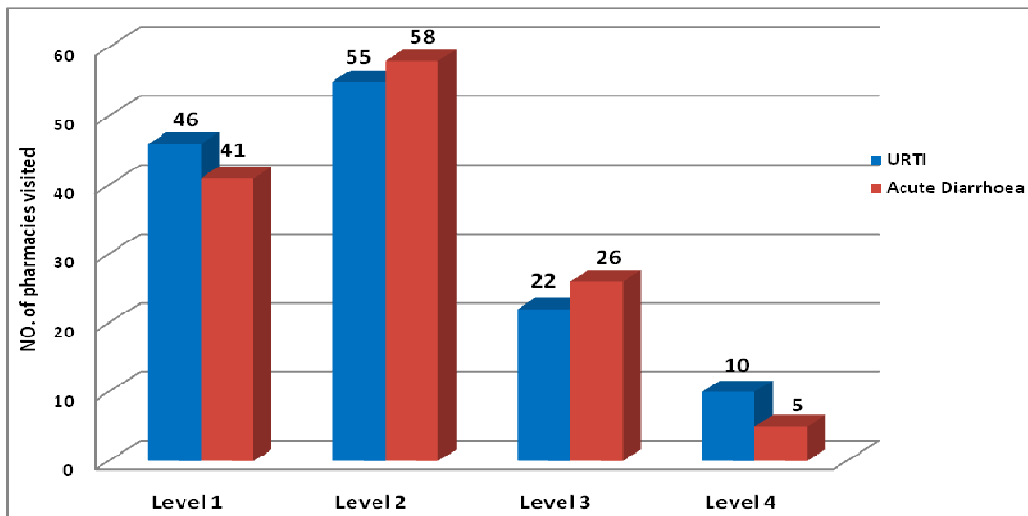
Ease of obtaining AMAs

The distribution of the percentage of pharmacies that dispensed antibiotics without prescription with different levels of demand for simulated scenarios is summarized in Table 1 and Graph 1. In level 1 & 2 which are without or very little insistence for both clinical conditions, we obtained maximum 76% of AMAs. Directly insisting for AMAs when denied by pharmacists resulted in reversal of diniel in 16% cases for sore throat and 20% cases in acute diarrhea (level 3). With all levels of demand, AMAs were dispensed in 92% & 96% cases of sore throat and acute diarrhea respectively.

Table 1
Percentage of pharmacies willing to sell / selling antibiotics without medical prescription according to strength of patient demand

Level of demand	Clinical cases and issue of [%] AMAs	
	SoreThroat(n=133)	Acute diarrhea (n= 130)
Level 1	46 (34.58%)	41 (31.53%)
Level 2	55 (41.35%)	58 (44.61%)
Level 3	22 (16.54%)	26 (20%)
All Level 1,2,3	123 (92.48%)	125 (96.15%)
Level 4	10 (7.5%)	5 (3.8%)

Graph 1
Sale of AMAs according to clinical cases and level of difficulty to obtain them

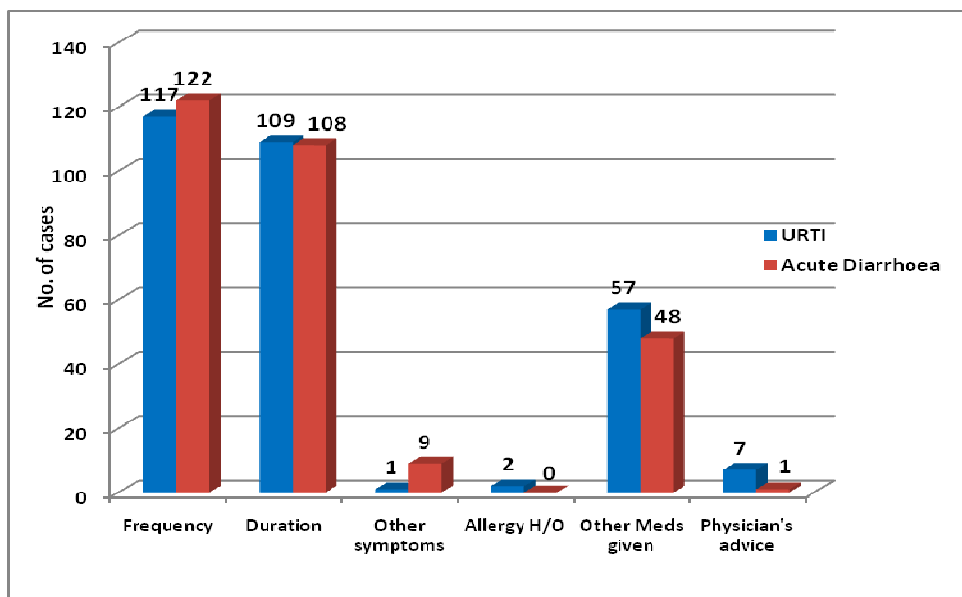


Level 1: Can I have something to relieve my symptoms
 Level 2: Can I have something stronger
 Level 3: I would like to have an antibiotic
 Level 4: Refused to dispense AMA

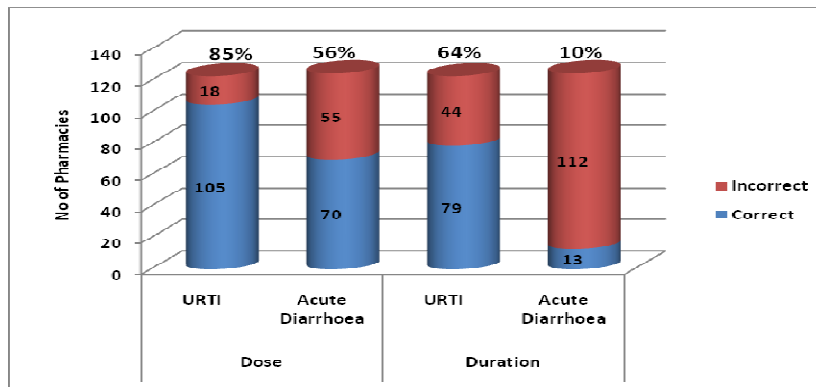
The number of pharmacies where the duration and the frequency of the AMAs were advised has been shown in Graph 2. Though most of the pharmacists advised dose and duration for dispensed AMAs, but were dispensed in correct does and duration for sore throat in

62% and for acute diarrhea in 10% cases only shown in Graph 3. Only 2% of the visited pharmacists asked about history of drug allergy when dispensing any antibiotics for any of the simulated clinical scenarios & 8% pharmacies recommended physicians advice.

Graph 2
Pharmacists' inquiries and recommendations in Response to the simulated clinical scenarios



Graph 3
Advice by the pharmacists about the duration/frequency of dosing of dispensed AMAs



The type of AMAs which were dispensed

The different AMAs obtained during study have been described in Table 2 and 3 for both simulated conditions. Commonly given AMAs for sore throat was Azithromycin 63 (51.21%) and for acute diarrhea were Norfloxacin 40 (32%) and Nitroimidazole group of AMAs 79 (63%) .

Table 2
Antibiotics obtained in clinical condition sore throat

Sore Throat (n=123)				
Antibiotics obtained	No. of cases	Incorrect Dose	Incorrect duration	Correct D/D
Azithromycin	63	0	1	62
Amoxicillin	20	15	11	09
Clarithromycin	10	03	06	04
Erythromycin	12	06	10	02
Amox +Clav.acid	3	3	2	1
Amox + Clox.	5	5	4	1
Levofloxacin	3	1	3	0
Roxithromycin	3	2	0	0
Cefadroxil	4	2	4	0

Amox= Amoxicillin, Clav.acid = Clavulanic acid, Clox = Cloxacillin

Table 3
Antibiotics obtained in clinical condition acute diarrhea

Acute Diarrhea (n=125)				
Antibiotics obtained	No. of cases	Incorrect dose	Incorrect duration	Correct D/D
Norfloxacin	40	15	37	3
Metronidazole	26	12	22	4
Norflox +Tz	18	7	16	2
Furazolidone+ Metro	27	12	24	3
Furazolidone +Tz	06	04	05	1
Furazolidone	02	00	02	00
Ofloxacin + Or	06	05	06	00

Tz = Tinidazole , Or = Ornidazole

DISCUSSION

This is the systematic cross sectional study showing the improper dispensing of antibiotics in pharmacies of Pune, India with neither a

prescription nor a diagnosis from a physician. The investigators simulated sore throat and acute diarrhea as described in methodology to

obtain AMAs using various levels of demand. In the present study AMAs were obtained in 95% pharmacies. The percentage identified in our study was higher than those found in previous studies carried out in India as well as in other countries.^{22, 1, 14} Recently study carried out by Rathnakar U.P. et al. in South India showed out of selected 60 pharmacies nearly 50% of the pharmacists declined to issue AMAs²². In two international studies that used actors to simulate cases of rhino sinusitis, antibiotics were sold in 70% of pharmacies approached in Greece¹ and in 58% of pharmacies approached in Brazil. The same study carried out in Brazil also reported that antibiotics were obtained in 74% of the pharmacies after insistence¹⁴. In the present study, azithromycin 63% and norfloxacin 32% were commonly obtained AMAs for sore throat and acute diarrhea respectively. While study carried out in South India resulted in Amoxicillin and fluoroquinolones as the most common AMAs which were dispensed by the pharmacists²². According to the present study, there is an irrational dispensing of antibiotics in the pharmacies of India. We observed that antibiotics could be easily obtained, as 95% of the pharmacists dispensed AMAs without prescriptions or an evidence-based indication in Pune, India. But this figure is no reason for any solace, as AMAs should not be dispensed at all without a physician's advice, for the fear of the organisms developing resistance. There are major potential sequelae associated with this practice. Not only were the AMAs dispensed without prescription but what made the practice worse was that the duration and the frequency of the administration of these drugs were wrongly advised more than 60%. Only 2% of the visited pharmacists asked about the history of drug allergy when dispensing any antibiotics & 8% pharmacies recommended physicians advice. These results are comparable to studies carried out in South India and Abu Dhabi where none asked about allergy history^{22, 2}. Similarly only 5% asked medical evaluation in the same study carried out in Abu Dhabi². During the study we also

found an important omission of essential medication such as oral rehydration solution (ORS) has not been given by a single pharmacist when we simulated clinical condition acute diarrhea. Lomotil or Loperamide been given with AMAs in more than 60% of diarrhea cases. In the present study, the investigators asked directly for an antibiotic because the purpose was to show how antibiotics were sold when no prescription was provided and no justification for taking an antibiotic was present. The investigators insisted on obtaining an antibiotic when the pharmacist refused in order to indicate the effect of persistence on obtaining an antibiotic when it is not clearly needed. We recognize, however, that this method could have increased the number of offers of antibiotics by the attendants. Another limitation of our study was that no differentiation was made between whether it was an attendant or pharmacist who agreed to dispense the antibiotic without a prescription. Preventing the sale of unprescribed antibiotics can be a way to inhibit bacterial resistance, a worldwide health problem, and the unnecessary adverse reactions and allergies caused by antibiotics. At present, clinical problems attributable to the spread of resistance and the scarce development of new antibiotics make the rational use of antibiotics necessary in the community settings²³. There is a need for strict enforcement and adherence to existing regulations regarding antibiotics sale.

CONCLUSION

Dispensing antimicrobials without prescription is high in Pune. Most AMAs were dispensed in wrong dose and duration. Health education programs should be directed towards general public and pharmacists to know the dangers of misuse or overuse of antibiotics. Our study results may strengthen the legal process which is underway in restricting the use of antimicrobial agents in India. It may result in accurate treatment of patients and the prevention of antibiotic resistance.

REFERENCES

1. Contopoulos-Ionnis DG, Kolioti ID, Koutroumpa IC, Giannakakis IA, Ioannidis JP: Pathways for inappropriate dispensing of antibiotics for rhinosinusitis: a randomized trial. *Clin Infect Dis*, 33:76-82, (2001).
2. Dameh M, Green J, Norris P: Over-the-counter sales of antibiotics from community pharmacies in Abu Dhabi. *Pharm World Sci*, 32:643-650, (2010).
3. Llor C, Cots JM: The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. *CID*, 48:1345-49, (2009).
4. Bax RP, Anderson R, Crew J, Fletcher P, Johnson T, Kaplan E, Kanus B, Kristinsson K, Malek M, Strandberg L: Antibiotic resistance: what can we do? *Nat Med*, 4: 545-6, (1998).
5. Austin DJ, Kristinsson KG, Anderson RM: The relationship between the volume of antimicrobial consumption in human communities and the frequency of resistance. *Proc Natl Acad Sci USA*, 96 (3):1152-6, (1999).
6. Goossens H, Ferech M, Vander Stichele R, Elseviers M: Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. *Lancet*, 365 (9459): 579-87, (2005).
7. Little P, Rumsby K, Kelly J, et al.: Information leaflet and antibiotic prescribing strategies for acute lower respiratory tract infection: a randomized controlled trial. *JAMA*, 293(24):3029-3035, (2005).
8. Sarkar P, Gould IM: Antimicrobial agents are societal drugs: how should this influence prescribing? *Drugs*, 66(7):893-901, (2006).
9. Spellberg B, Guidos R, Gilbert D, et al.: Infectious Diseases Society of America. The epidemic of antibiotic-resistant infections: a call to action for the medical community from the Infectious Diseases Society of America. *Clin Infect Dis*, 46 (2):155-164, (2008).
10. Srivastava RK. A review on the current situation regarding the manufacture, use and the misuse of antibiotics in the country. In: National Policy for the Containment of Antimicrobial Resistance. New Delhi. Published by Directorate General of Health Services; 14-7, (2011).
11. CDDEP [Internet]. Regulating Over-the-Counter Antibiotic Sales: What Will "Schedule HX" Mean for India? Available from: http://www.cddep.Org/blog/posts/regulating_over_the_counter_antibiotic_sales_what_will_schedule_hx_mean_india. (Updated 2011 Aug 2; cited Sept. 2011).
12. Llor C, Cots JM. The sale of antibiotics without prescriptions in pharmacies in Catalonia, Spain. *Clin Infect Dis.*; 48: 1345-9, (2009).
13. Al-Faham Z, Habboub G, Takriti F. The sale of antibiotics without prescriptions in pharmacies in Damascus, Syria. *J Infect Dev Ctries.*; 5: 396-9, (2011).
14. Volpato DE, De Souza BV, Dalla Rosa LG, Melo LH, Daudt CA, Deboni L. The use of antibiotics without medical prescriptions. *Braz J Infect Dis*;9: 288-91, (2005).
15. Okeke IN, Lamikanra A, Edelman R. Socioeconomic and behavioral factors which lead to an acquired bacterial resistance to antibiotics in the developing countries. *Emerg Infect Dis*; 5:18-27, (1999).
16. De Ferranti S.D., Ioannidis J.P., Lau J., et al. Are amoxicillin and folate inhibitors as effective as other antibiotics for acute sinusitis? A meta-analysis. *BMJ*;317:632-7, (1998).
17. Evidence based report: diagnosis and treatment of acute bacterial rhinosinusitis. Boston: New England Medical Center Evidence Based Practice Center; document no. AHCPR 290-97-0019, (1998).
18. Goossens H, Ferech M, Vander Stichele R, Elseviers M, ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. *Lancet* 365: 579-587, (2005).
19. Carbon C, Bax RP: Regulating the use of antibiotics in the community. *BMJ*, 317: 663-5, (1998).
20. Madden JM, Quick JD, Ross-Degnan D, Kafle KK: Undercover careseekers: Simulated clients in the study of health provider behavior in developing countries. *Soc Sci Med*, 45:1465-82, (1997).
21. Watson M, Norris P, Granas A: A systematic review of the use of simulated patients and pharmacy practice research. *IJPP*, 14:283-93, (2006).
22. Rathnakar U.P., Nitish Kumar Sharma, Raina Garg, Unnikrishnan B, Gopalakrishna HN. A Study on the Sale of Antimicrobial Agents without Prescriptions in Pharmacies in an Urban Area in South India. *Journal of Clinical and Diagnostic Research*, Vol-6(6): 951-954, August (2012).
23. Cars O, Hoberg LD, Murray M, et al. Meeting the challenge of antibiotic resistance. *BMJ*;337:al 438, (2008).