

Self Medication with Antibiotics among Medical and Pharmacy Students in North India

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Abstract: Self medication practices among the medical and paramedical professionals have been reported in many countries, however, very limited research was done exclusively on antibiotic in North India. This study was designed to assess the prevalence and pattern of antibiotic usage for self diagnosed diseases among the medical and pharmacy students. This was a questionnaire based cross sectional study conducted among medical and pharmacy students in North India. A total 326 students participated in the study and data of 316 students were eligible for analysis. 57.63% medical and 66.9% pharmacy students reported to use antibiotics in last one year. Fever was the predominant ailments for which medical (48.41%) and pharmacy (46.88%) students' self medicated. Most of the medical (74.6%) and pharmacy (61.9%) students had preferred amoxicillin for their ailments. The majority of medical students, 65.87% have self medicated because of their pharmacological knowledge in contrast to 62.1% pharmacy students. Adverse drug reaction experienced by 29.36% and 11.7% medical and pharmacy students respectively. Statistically no significant difference was observed in antibiotic usage between medical and pharmacy students ($p = 0.08$). To curb the growing trend of this unethical practices students of health care professional needs to be educated.

Keywords: Self Medication, Antibiotics, Medical, Pharmacy, India

Introduction

Self medication is defined as selection and self-administration of medicine either for diagnosis, treatment or acquisition and intake of drugs for self diagnosed disorders without prescription of a physician (Badiger *et al.*, 2012). Many people do not approach a physician during their illness instead they consult the community pharmacist, family members, friends, home medicine cabinet, supermarket or procure from the left over medicine used for prior illness (Ahmad *et al.*, 2012; Almasdy and Sharrif, 2011).

Self administration of antibiotic is very common in other countries like Nigeria (Fadare and Tamuno, 2011), Israel (Raz *et al.*, 2005), Iran (Sarahroodi *et al.*, 2010), Jordan (Al-Azzam *et al.*, 2007), Abu Dhabi (Abasaed *et al.*, 2009), Sudan (Awad *et al.*, 2005) and Indonesia (Widayati *et al.*, 2011). Studies from South

India reported that this practice is very common among medical professionals and rate of antibiotics use among them are also very high (Badiger *et al.*, 2012; Kumar *et al.*, 2013).

Antibiotics are considered as wondered drug (NPCAR, 2011) and it comes under Schedule H of the drug and cosmetics act of India, which is of use when given by a registered medical practitioner. Despite the existing rule, sustainable effective interventions are lacking which results in easy availability of antibiotics in open market in India. Inappropriate choice of antibiotics, use of insufficient dosage, inadequate treatment duration or unnecessary therapy increases the risk of antibiotic resistance (Grigoryan *et al.*, 2007), which is a major public health problem globally in the coming century (Alanis, 2005). It also leads to treatment failure, serious adverse drug reactions, enhanced cost, increased period of hospitalization and morbidity (Donkor *et al.*, 2012).

As pharmacy and medical students play a significant role in health care decision making and they represent a major part of community that is highly qualified, trained and superior in medical and health related information. So identification and evaluation of self medication pattern and perception among them needs to be considered for making different interventional strategies.

Materials and Methods

This study was a questionnaire based cross sectional study, conducted among the medical students of two medical colleges located in Assam and Uttar Pradesh in India and pharmacy graduates of National Institute of Pharmaceutical Education and Research (NIPER), Hajipur, Bihar, India. This study was conducted between January to April, 2015. Students who participated in the study were explained about the aim of the study. They were ensured about anonymity and confidentiality of the information collected. Written informed consent was taken from all the students. The questionnaire was chosen from previous studies and modified according to the local needs (Awad and Eltayeb, 2007; Kumar *et al.*, 2013). The questionnaire had questions related to demographic information of the participants, name of the antibiotics, indication for use, the information source about the antibiotic, their dose, reasons for self administration and idea about self medication etc. Questionnaire was administered during the lecture session to the participating students. The filled questionnaires were evaluated for their completeness and only the data from the completely entered questionnaires were taken for analysis. The collected data were analyzed using Microsoft excel and Statistical Packages for Social Sciences (SPSS) version 16. The results obtained were presented in percentage and Chi-square test was used to find out the association among the variables. P value <0.05 was considered for statistical significance.

Results

A total 326 students participated in the study; the data of 316 students were filled consistently and completely. Thus, the data of 316 students were eligible for analysis,

of which 177 were medical and 139 pharmacy students. The majority of medical and pharmacy students were males (75.1% Vs. 70.5%). Total numbers of medical and pharmacy students indulging in self medication were 126 and 111 respectively. Among the medical students 96 (72.1%) males and 30 (68.1%) females were found indulging in self medication. Among pharmacy students 77 (78.5%) males and 34 (82.9%) females were found practicing self medication (Table 1). The prevalence of antibiotics usage among medical and pharmacy students were found to be 71.1% (n = 126) and 79.8% (n = 111) in their lifetime, whereas in last one year 57.6% medical and 66.9% pharmacy students had indulged in self medication.

The purpose for which the medical students used antibiotic were mostly for fever (48.4%), diarrhea (47.6%) followed by cough (46%) and sore throat (43.6%) whereas, the predominant ailments for which pharmacy students was fever (46.8%) followed by cough (30.6%), sore throat (29.7%) and diarrhea (23.4%) (Table 2).

Antibiotics commonly used by the students are shown in Table 3. The most common antibiotic used by the medical students was amoxicillin (74.6%) and least commonly was doxycycline (2.3%), whereas among Pharmacy students amoxicillin (42.3%) was the most frequently used antibiotic followed by azithromycin (41.4%) and neomycin (0.9%).

The majority of medical students (65.8%) used self medication because they thought that they had sufficient pharmacological knowledge about the antibiotics in contrast to 62.1% of the pharmacy students (Table 4). 29.3% of medical students reported adverse drug reaction during the course of treatment, whereas only 11.7% pharmacy students experienced the same. Regarding completion of the treatment course, 72.2% of medical students took full course of antibiotic therapy in contrast to 33.3% of pharmacy students.

The most common source of information for medical students on preferred antibiotics for self medication was previous doctor's prescription (61.1%) followed by academic knowledge (58.7%), whereas for pharmacy students, academic knowledge (55.8%) followed by their own experience (33.3%) (Table 5).

Table 1. Characteristics of the study participants (N = 316)

Pharmacy students			
Gender	Total (n = 139)	Self medication (n = 111)	P value
Male	98	77 (78.5%)	0.56
Female	41	34 (82.9%)	
Mean age (years) ± SD	24.1±0.96		
Medical students			
Gender	Total (n = 177)	Self medication (n = 126)	0.61
Male	133	96 (72.1%)	
Female	44	30 (68.1%)	
Mean age (years) ± SD	22.7±1.22		
Self medication			
Medical students		126 (71.18%)	0.08
Pharmacy students		111 (79.85%)	

Table 2. Indications for self medication

Indications	Frequency (%)	
	Medical (N=126)	Pharmacy (N = 111)
Fever	61(48.4)	52(46.8)
Cough	58(46)	34(30.6)
Sore throat	55(43.6)	33(29.7)
Diarrhea	60(47.6)	26(23.4)
Runny nose	53(42)	18(16.2)
Aches and pain	18(14.2)	15(13.5)
Skin wounds	14(11.1)	14(12.6)
Nasal congestion	38(30.1)	11(9.9)
Conjunctivitis	8(6.3)	7(6.3)
Vomiting	27(21.4)	4(3.6)
Urinary tract infection	33(26.1)	4(3.6)
Other	2(1.5)	1(0.9)

Table 3. Types of antibiotics commonly self prescribed

Antibiotics	Frequency (%)	
	Medical (N = 126)	Pharmacy (N = 111)
Amoxicillin	94(74.6)	47(42.3)
Azithromycin	78(61.9)	46(41.4)
Ciprofloxacin	18(14.2)	26(23.4)
Amoxicillin/Clavulanic acid	74(58.7)	20(18)
Metronidazole	35(27.7)	20(18)
Norfloxacin	39(30.9)	15(13.5)
Ofloxacin	27(21.4)	13(11.7)
Cefalosporin	22(17.4)	9(8.1)
Tinidazole	5(3.9)	7(6.3)
Ampicillin	58(46)	5(4.5)
Tetracycline	7(5.5)	3(2.7)
Doxycycline	3(2.3)	3(2.7)
Chloramphenicol	9(7.1)	3(2.7)
Penicillin	11(8.7)	3(2.7)
Sulfonamide	26(20.6)	2(1.8)
Co-trimoxazole	16(12.6)	2(1.8)
Neomycin	13(10.3)	1(0.9)

Table 4. Reasons for self medication

Reasons	Frequency (%)	
	Medical (N = 126)	Pharmacy (N = 111)
Sufficient pharmacological knowledge	83(65.87)	69(62.1)
To save time	80(63.49)	43(38.7)
Avoid crowd at outpatient department	47(37.3)	33(29.7)
Cost saving	39(30.95)	29(26.1)
Lack of physician	0(0.00)	1(0.9)
Privacy	6(4.76)	0(0.00)
Others	5(3.96)	0(0.00)

Table 5. Source of information about antibiotics

Information source	Frequency (%)	
	Medical (N = 126)	Pharmacy (N = 111)
Academic knowledge	74(58.7)	62(55.8)
My own experience	61(48.4)	37(33.3)
Previous doctor's prescription	77(61.1)	27(24.3)
Recommended by community pharmacists	28(22.2)	14(12.6)
Opinion of friends	24(19)	14(12.6)
Opinion of family members	16(12.6)	11(9.9)
Recommended by seniors	31(24.6)	3(2.7)
The advertisement	0(0.00)	3(2.7)

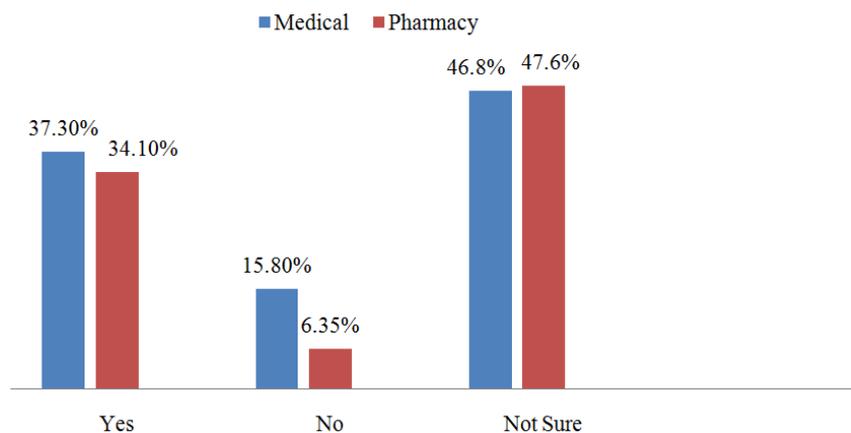


Fig. 1. Confident on treating common infectious disease

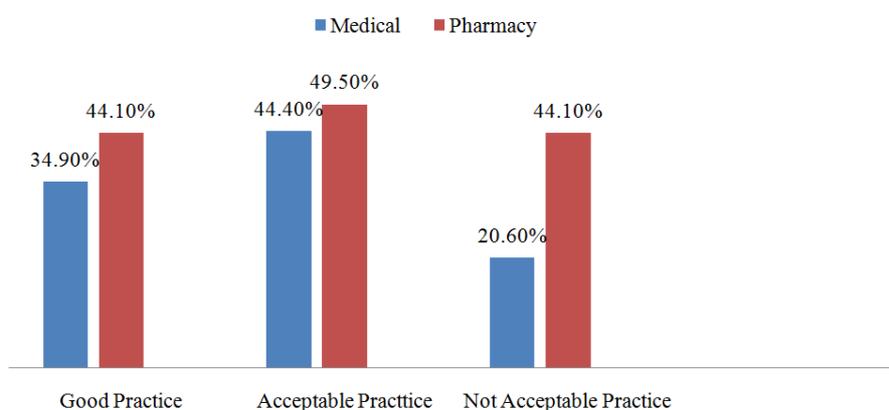


Fig. 2. Attitude of students towards self medication

About 44.4% of medical students considered self medication as an acceptable practice, whereas 20.6% had an opposite view on it. About half of the pharmacy respondents (49.5%) considered it as an acceptable practice compared to 44.1% against such opinion (Fig. 2). Majority of pharmacy (47.6%) and medical (46.8%) students had reported that they were not confident enough to treat common infectious diseases (Fig. 1).

Discussion

In India, to the best of our knowledge, this is one of the few comparative studies done exclusively on antibiotic self usage among medical and pharmacy students. Our study has shown a high prevalence of antibiotics self administration practices existing among the students of two major domains of health care. In concordance to the results our study, students of health care professionals also reported a high prevalence non prescription drugs usage (Banerjee and Bhadury, 2012; Aditya and Rattan, 2013). The rate of use of antibiotics among the students of health care in different countries

were found to be 43.2% in Nigeria (Ehigiator *et al.*, 2013), 47.8% in Southern China (Pan *et al.*, 2012), 79.5% in Sudan (Awad and Eltayeb, 2007) and 48% in Iran (Sarahrودي *et al.*, 2010).

Concerning to type of antibiotics commonly used, amoxicillin was reported as most commonly used antibiotic among medical as well pharmacy students, while the lowest tendency of self medication was observed with doxycycline as well as with neomycin. Similar observations were also found among medical undergraduates of Ghana (Donkor *et al.*, 2012) and Northern Nigeria (Fadare and Tamuno, 2011). The possible reasons behind the use of amoxicillin could be its better absorption property, easy availability, inexpensive, effective against a broad range of pathogen and considered as safe. In this study, participants reported fever, cough followed by diarrhea, which were the predominant conditions for the self medication, which is in concordance with the results from other study (Ling *et al.*, 2011; Pankaj *et al.*, 2015).

Most of the medical students cited that prescription which was advised for past illness was the main source

of information regarding antibiotic use. Using previous doctor's prescription for self diagnosed disorders may invite the risk of misdiagnosis, treatment failure and serious adverse drug reaction. Moreover, dose can also be insufficient to produce the desired effect due its previous use. Academic knowledge was the prominent source of information among pharmacy respondents. Similar observation as reported by medical students was also observed among dental students (Kumar *et al.*, 2013; Aditya and Rattan, 2013). However, in another study from India among pharmacy and nursing students showed that the pharmacists were the major source of information regarding antibiotics (Ritu *et al.*, 2011; Goel and Gupta, 2013).

Among the various reasons which indulged them into this practices, sufficient pharmacological knowledge and lack of time to visit doctors was the commonest. It is a common perception that as medical and pharmacy students possesses sound knowledge related to drugs, their pharmacological property and diseases, self medication practice was found to be more common among them. However, study among medical students from West Bengal, India, lack of time was the foremost reason (Banerjee and Bhadury, 2012). Another study from South India among medical professionals revealed illness was not severe enough to consult a physician (70.5%) followed by sufficient pharmacological knowledge (45%) as the foremost reason (Kumar *et al.*, 2013). Various common reasons for self administration practices among students as reported by other countries were less expensive (40.5%) in Ghana (Banerjee and Bhadury, 2012), prior experience of treating similar illness was observed (69.6%) in Ethiopia (Eticha, 2014) and (45.5%) in Bahrain (James *et al.*, 2006).

Respiratory Tract Infection (RTI) occurs mainly due to viral infections and antibiotics had no role in it. Despite this fact a high percentage of students had taken antibiotics for cough and sore throat, which ultimately led to financial loss and increases the risk of health hazards. A large proportion of pharmacy students did not complete the treatment course. It's well known fact that use of antibiotics at inadequate dose carries the risk of antibiotic resistance and its spread among microbial population (Harbarth and Samore Matthew, 2005). This may be the reason for the growing crisis of bacterial resistance which itself is a serious threat. Moreover, it also reduces the therapeutic option for clinicians. In addition to that, infection produce by these resistant pathogens poses economic burdens and treatment difficulty. Despite the antimicrobial drug laws that prohibits the use of antibiotics without written doctor's prescription, results of this study indicates, antibiotics are easily available without prescription and shows the high prevalence antibiotic self administration practices.

Limitation of the Study

This study was based on recollecting the information on antibiotics usage in the past one year, thus, it is affected by recall bias and students were requested to fill the questionnaire independently but mutual influence could not be completely ruled out. As the sample size of the study was small, so larger samples from multiple centers are required.

Conclusion

The results of our study showed that the use of antibiotics for self diagnosed disorders among medical and pharmacy students in North India is alarmingly high. The easy availability of antibiotics and knowledge of drugs and diseases might have encouraged them for self medication. The results obtained would be helpful in providing a framework for designing programs emphasizing on the risks associated with inappropriate use of antibiotics among budding health care professionals. To minimize the risk associated with the indiscriminate use of antibiotics and to create awareness regarding its merits and demerits, students of health care professionals needs to be educated.

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Author's Contributions

Biplab Pal: Participated in data collection and wrote the manuscript.

Krishna Murti: Designed the study.

Ashok Kumar Gupta: wrote the manuscript.

Urmi Choudhury: Participated in data collection.

Manoj Rastogi: Analyzed the data.

Harsh Pandey: Participated in data collection.

Chandra Shekhar Lal: Analyzed the data, wrote the manuscript.

Krishna Pandey: Wrote the manuscript.

Pradeep Das: Designed the study.

Conflicts of Interest

The authors declare that they have no conflicts of interest to disclose.

References

- Abasaheed, A., J. Vlcek, M. Abuelkhair and A. Kubena, 2009. Self-medication with antibiotics by the community of Abu Dhabi Emirate, United Arab Emirates. *J. Infect. Dev. Ctries.*, 3: 491-497. PMID: 19762966

- Aditya, S. and A. Rattan, 2013. SELF-medication among dental undergraduate students with antibiotics: Looking beyond the known. *Asian J. Pharm. Clin. Res.*, 6: 4-7.
- Ahmad, A., S. Parimalakrishnan, I. Patel, N.V. Kumar and T.R. Balkrishnan, 2012. Evaluation of self-medication antibiotics use pattern among patients attending community pharmacies in rural India, Uttar Pradesh. *J. Pharm. Res.*, 5: 765-768.
- Alanis, A.J., 2005. Resistance to antibiotics: Are we in the post-antibiotic era? *Arch. Med. Res.*, 36: 697-705. PMID: 16216651
- Al-Azzam, S.I., B.A. Al-Husein, F. Alzoubi, M.M. Masadeh and M.A. Al-Horani, 2007. Self-medication with antibiotics in Jordanian population. *Int. J. Occup. Med. Environ. Health*, 20: 373-380. PMID: 18165197
- Almasdy, D. and A. Sharif, 2011. Self-medication practice with nonprescription medication among university students: A review of the literature. *Arch. Pharm. Pract.*, 2: 95-100.
- Awad, A. and I. Eltayeb, 2007. Self-medication practices with antibiotics and antimalarials among Sudanese undergraduate university students. *Ann. Pharmacother.*, 41: 1249-1255. PMID: 17565044
- Awad, A., I. Eltayeb, L. Matowe and L. Thalib, 2005. Self-medication with antibiotics and antimalarials in the community of Khartoum State, Sudan. *J. Pharm. Pharm. Sci.*, 8: 326-331. PMID: 16124943
- Badiger, S., R. Kundapur, A. Jain, A. Kumar and S. Pattanshetty *et al.*, 2012. Self medication patterns among medical students in South India. *Aus. Med. J.*, 5: 217-220. DOI: 10.4066/AMJ.2012.1007
- Banerjee, I. and T. Bhadury, 2012. Self-medication practice among undergraduate medical students in a tertiary care medical college, West Bengal. *J. Postgrad. Med.*, 58: 127-131. PMID: 22718057
- Donkor, E.S., P.B. Tetteh-Quarcoo, P. Nartey and I.O. Agyeman, 2012. Self-medication practices with antibiotics among tertiary level students in Accra, Ghana: A cross-sectional study. *Int. J. Environ. Res. Public Health*, 9: 3519-3529. PMID: 23202760
- Ehigiator, O., C.C. Azodo, A.O. Ehizele, E.B. Ezeja and L. Ehigiator *et al.*, 2013. Self-medication practices among dental, midwifery and nursing students. *Eur. J. Gen Dent.*, 2: 54-54. DOI: 10.4103/2278-9626.106813
- Eticha, T., 2014. Prevalence and predictors of self-medication with antibiotics among Adi-haqi Campus students of Mekelle University, Ethiopia. *Int. J. Pharma Sci. Res.*, 5: 678-684.
- Fadare, J.O. and I. Tamuno, 2011. Antibiotic self-medication among university medical undergraduates in Northern Nigeria. *J. Public Health Epidemiol.*, 3: 217-220.
- Goel, D. and S. Gupta, 2013. Self-medication patterns among nursing students in North India. *ISOR J. Dental Med. Sci.*, 11: 14-17.
- Grigoryan, L., J.G. Burgerhof, F.M. Haaijer-Ruskamp, J.E. Degener and R. Deschepper *et al.*, 2007. Is self-medication with antibiotics in Europe driven by prescribed use? *J. Antimicrob. Chemother.*, 59: 152-156. PMID: 17124192
- Harbarth, S. and H. Samore Matthew, 2005. Antimicrobial resistance determinants and future control. *Emerg. Infect. Dis.*, 11: 794-801. DOI: 10.3201/eid1106.050167
- James, H., S.S. Handu, K.A. Al Khaja, S. Ottom and P.S. Reginald, 2006. Evaluation of the knowledge, attitude and practice of self-medication among first-year medical students. *Med. Princ. Pract.*, 15: 270-275. PMID: 16763393
- Kumar, N., T. Kanchan, B. Unnikrishnan, T. Rekha and P. Mithra *et al.*, 2013. Perceptions and Practices of Self-Medication among Medical Students in Coastal South India. *PLoS One*, 8: e72247-e72247. PMID: 24015223
- Ling, O.A., H.M. Azmi, M.S. Al-Haddad, S.A.S. Sulaiman and A.A. Shafie *et al.*, 2011. Public knowledge and attitudes towards antibiotic usage: A cross-sectional study among the general public in the state of Penang, Malaysia. *J. Infect. Dev. Ctries.*, 5: 338-347. PMID: 21628809
- NPCAR, 2011. Directorate general of health services, ministry of health and family welfare. National Policy for Containment of Antimicrobial Resistance.
- Pan, H., B. Cui, D. Zhang, F. Jeremy and L. Frieda *et al.*, 2012. Prior knowledge, older age and higher allowance are risk factors for self-medication with antibiotics among University students in Southern China. *PLoS One*, 7: e41314-e41314. PMID: 22911779
- Pankaj, K.C., K.M. Aravind, A. Jain, S. Neha and M. Ajitesh, 2015. Self medication practices with antibiotics among health care Professional in Uttar Pradesh, India: A questionnaire based study. *Indo Am. J. Pharmaceut. Res.*, 5: 752-759.
- Raz, R., H. Edelstein, L. Grigoryan and F.M. Haaijer-Ruskamp, 2005. Self-medication with antibiotics by a population in Northern Israel. *Isr. Med. Assoc. J.*, 7: 722-725. PMID: 16308996
- Ritu, P., S. Himmat, R. Manisha, G. Gaurav and B. Priya, 2011. An online exploratory study of self medication among pharmacy graduates in India. *Int. J. Drug Develop. Res.*, 3: 200-207.
- Sarahroodi, S., A. Arzi, A.F. Sawalha and A. Ashtarinezhad, 2010. Antibiotics self-medication among southern Iranian university students. *Int. J. Pharmacol.*, 6: 48-52. DOI: 10.3923/ijp.2010.48.52
- Widayati, A., S. Suryawati, C. De Crespigny and J.E. Hiller, 2011. Self medication with antibiotics in Yogyakarta City Indonesia: A cross sectional population-based survey. *BMC Res. Notes.*, 4: 491-491. PMID: 22078122