

Self-medication practice and factors influencing it among medical and paramedical students in India: A two-period comparative cross-sectional study

Ritesh Kumar,
Aman Goyal,
Biswa Mohan Padhy¹,
Yogendra Kumar Gupta

Department of Pharmacology, All India Institute of Medical Sciences, New Delhi, ¹Department of Pharmacology, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

Address for correspondence:

Prof. Yogendra Kumar Gupta, Department of Pharmacology, All India Institute of Medical Sciences, New Delhi, India. E-mail: yk.ykgupta@gmail.com

Abstract

Aim: Self-medication is widely practiced with varying dimensions in India. This practice has many implications, especially among medical and paramedical students having some knowledge and good exposure to drugs. We conducted a two-period observational study to evaluate the change in knowledge and practice of self-medication, over 5 years of time period, among medical and paramedical students from different parts of India. **Materials and Methods:** A structured questionnaire was administered to medical (MBBS), dental (BDS), and paramedical students, who come to attend pan India annual cultural, literary, and sports event at New Delhi. The study was conducted in two phases (2007 and 2012) in different respondents of same categories (medical and paramedical) of students. Three-hundred and thirty students from 39 colleges in 2007 and 356 students from 38 colleges in 2012 participated in the study. **Results:** The prevalence of self-medication remained high in both 2007 and 2012 (74.6% and 69.4%), although no significant difference was observed between the two phases ($P = 0.14\%$). Oral antibacterial agents, oral anti-inflammatory agents, and antipyretics were the most common group of drugs used in both phases of study. A significant increase was observed in number of students who took complete course of oral antibiotics (28.3-38.3%, $P = 0.01$). **Conclusion:** The prevalence of self-medication among undergraduate students remains unaltered over the span of 5 years. Nevertheless, there was a better sensitization toward appropriate antibiotic usage and the practice of responsible self-medication needs to be promoted among future healthcare providers.

Key words: Antibiotic use, cross-sectional study, medical students, paramedical students, self-care, self-medication

INTRODUCTION

World Health Organization defines self-medication as the use of medicines by individuals to treat self-recognized illnesses or symptoms.^[1] It is a form of self-care and “responsible self-medication” facilitates rapid and inexpensive access to treatment, reduces the burden on health care infrastructure, thus playing

an important role in a developing country like India, which has limited and uneven distribution of healthcare professionals.^[2] Worldwide, over the counter drugs or “nonprescription drugs” are used in the practice of responsible self-medication, and are generally considered to be safe and effective. However, a pitfall in this practice of responsible self-medication, especially in India is

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that prescription drugs are also commonly dispensed without valid prescriptions.^[3] Such practice poses many medical and social challenges with widespread implications.^[4] Wrong self-diagnosis leading to delayed treatment, unnecessary out of pocket expenditure, adverse drug reactions due to incorrect dosage, drug-drug interactions, incorrect route of administration, and drug dependence are some of the well-recognized drawbacks of self-medication.^[5]

It has been observed that medical and paramedical students are commonly involved in the practice of self-medication, without complete knowledge about the therapy they are taking.^[6] Although there are many studies estimating the prevalence of self-medication worldwide, very few studies have been conducted in India to study the practice of self-medication among medical students. Most of these cross-sectional Indian studies have been conducted among MBBS students at a single institution.^[7-12] Since knowledge of medical science evolves as students advance in their course, we attempted to evaluate the change in the practice of self-medication, without any active intervention, in two completely different batches of students with a time gap of 5 years through a two-period, cross-sectional, questionnaire-based study in an assembly of medical and paramedical students from different medical colleges of India.

MATERIALS AND METHODS

We carried a two-period questionnaire based cross sectional study being in 2007 and 2012. The respondents were medical students (MBBS) and dental (BDS), and paramedical students (B.Sc. Nursing, B.Sc. Optometry, and B.Sc. Medical Technology in Radiography), who came to participate in an all-India annual cultural, literary, and sports event organized at the All India Institute of Medical Sciences, New Delhi. Only up to 20 students from one college were enrolled to ensure heterogeneity of the study population. The MBBS and BDS students prior to starting their internship (not passed the final year exam) and paramedical students, who were willing to voluntarily participate, were enrolled in the study. Randomly selected consenting participants were asked to fill a three-page 23 items self-structured questionnaire. The items of the questionnaire had been previously generated, reviewed, and prevalidated by a panel of senior faculty members. It was administered to five students of each category, studying in our institution and pilot tested and suitable modifications were carried out before finalizing it for our study. The questionnaire included items to capture information about demography, prevalence, practice, and knowledge

related to self-medication. The participants were given sufficient time to fill this questionnaire by striking out the most appropriate option against each item.

The respondents were different during both the surveys (2007 and 2012), but categories (medical and paramedical) remained the same. Self-medication was defined as the use of medicinal products (allopathic or traditional) for treatment or prevention of self-diagnosed medical disorders without a valid prescription from medical practitioner during past 1 year. This study was conducted among students who come to attend an annual cultural event organized at our institute and did not involve any intervention or elicited anything that was confidential or private in nature. It was conducted in accordance with the Declaration of Helsinki.

Data were analyzed using Statistical Package for the Social Sciences (SPSS, Chicago, IL, USA) version 15 for windows. For quantitative data, Chi-square test/Fisher's exact test and for continuous data, Student's *t*-test was applied, wherever applicable. Besides this, the comparison between the 2 times period in the same group was done by applying paired *t*-test/Wilcoxon signed-rank separately in each group, wherever necessary. The outcomes were expressed as mean \pm standard deviation or in %. A $P < 0.05$ (2-tailed) was considered as statistically significant.

RESULTS

This study was conducted in two phases. In first phase in 2007, a total of 330 students from 39 colleges participated in the study; whereas in 2012, 356 students from 38 colleges participated in the study. Three questionnaire in 2007 and 19 in 2012 were found to be incomplete and excluded from the final analysis. Hence, a total of 327 students in 2007 and 337 students in 2012 were included in study analysis. The study population in 2012 (19.90 ± 1.28 years) was statistically significant younger than in 2007 (20.27 ± 1.67 years) [Table 1]. A statistically nonsignificant decrease was observed in the prevalence of self-medication which was found out to be 74.6% (244 out of 327) in 2007 and 69.4% (234 out of 337) in 2012 [Table 1]. The proportion of students who were involved in this practice was found to be highest in the 3rd year of their professional studies in both the phases [Table 2] and was not influenced by the medical profession of their parents. There seems to be no gender predominance but statistically significant differences were observed in the category of the students (medical and paramedical) in which self-medication was observed in two phases of the study ($P < 0.001$) [Table 3].

Table 1: Profile of students enrolled in the study

Variable	2007 (n = 327) (%)	2012 (n = 337) (%)	P
Age	20.8±1.67	19.9±1.28	0.002
Sex (male)	149 (45.6)	141 (41.8)	0.33
Student group			
MBBS students	231 (70.6)	238 (70.6)	<0.001
BDS students	5 (1.5)	28 (8.3)	
B.Sc. (Nursing, Optometry, Radiographer)	91 (27.9)	71 (21.1)	
Parents' profession			
Doctor	26 (8.0)	38 (11.3)	0.05
Related to healthcare besides Doctor	9 (2.8)	19 (5.6)	
Not related to healthcare	292 (89.2)	280 (83.1)	
Students who practiced self-medication	244 (74.6)	234 (69.4)	0.14

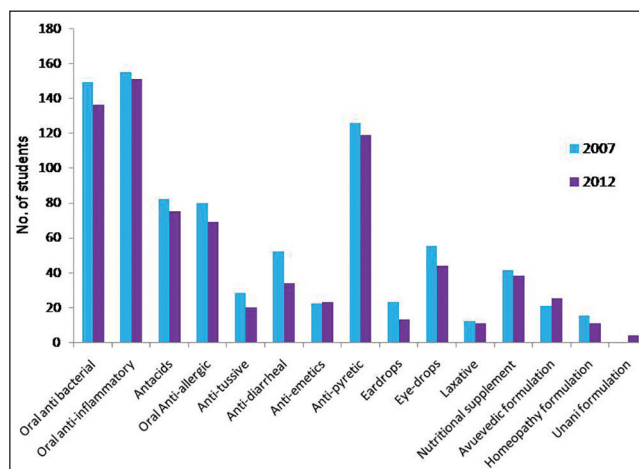
Table 2: Distribution of students participating in this study according to their year of medical studies

Year of study	2007			2012		
	Practicing self-medication	Practicing self-medication	Practicing self-medication	Practicing self-medication	Practicing self-medication	Practicing self-medication
	Yes	No	Total (%)*	Yes	No	Total (%)*
First	16	10	26 (61.54)	3	2	5 (60.00)
Second	129	53	182 (70.88)	161	89	250 (64.4)
Third	86	15	101 (85.15)	63	11	74 (85.14)
Fourth	13	5	18 (72.22)	7	1	8 (87.5)
Total	244	83	327 (74.61)	234	103	337 (69.45)

*Percentage the proportion of students from the same year of study (first, second, third, or fourth) who practiced self-medication

There was no statistical difference in reasons for self-medication during both phases of the study, with symptomatic relief as the foremost reason for this practice, other being for preventive, diagnostic purpose, or as a tonic for general well-being [Table 3]. It is noteworthy that in 2012, significantly lesser number of students practiced self-medication of their own than in 2007. In addition, the number of students who relied more on personal experience rather than other sources of information (including other's experience, books, etc.,) to establish the correct dose were significantly less in 2012 than in 2007 ($P = 0.001$). However, in both the periods, books and literature were not considered as the primary sources for establishing the correct dose of medication. Interestingly, majority of students claimed that they were aware of the possible side effects in the both phases of the study (56.1% in 2007 and 60.7% in 2012). There was no change between 2007 and 2012 with respect to the use of different system of medicines with most taking medicines from allopathic system and very few using alternative systems viz. Ayurvedic, Homeopathy, or Unani.

Among the 19 group of medications asked in the questionnaire, oral antibacterial agents (antibiotics), oral anti-inflammatory agents, and antipyretics were the common groups of drugs being used for self-medication in both 2007 and 2012 [Figure 1]. Importantly, significant increase was observed from 2007 to 2012 (46.3-66.9%,

**Figure 1: Drugs used for self-medication**

$P = 0.001$) in the number of students who took complete course of oral antibiotics, rather than leaving the therapy incomplete after symptomatic relief [Table 3]. In both the time periods, almost three-fourth of students accessed the drugs for self-medication directly from chemist shops in the market. Majority of the students also reported symptomatic relief with use of the medicine and would also advise the use of these medicines to others.

DISCUSSION

In this study, the prevalence rate of self-medication among medical and paramedical students remain high in both the phases and was found to be 74.6% in 2007 and 69.4% in 2012, indicating a small but statistically nonsignificant change in trend over the 2 time points. This was probably due to increased awareness and better drug regulations (such as ban on certain fixed dose combinations, ban on misleading TV commercials of drugs, etc.,) during this time span. The overall prevalence rates of this practice, found in both the phases, were in accordance with the other studies on the prevalence of self-medication (57.1-92.0%) among medical students in India.^[8-12] However, previous Indian studies included only MBBS students from only one center

Table 3: Students practicing self-medication

Variable	2007 (n = 244) (%)	2012 (n = 234) (%)	P
Age	20.4±1.71	19.7±1.31	0.006
Sex (male)	101 (41.4)	101 (43.2)	0.69
Student group			
MBBS students	157	152	<0.001
BDS students	3	23	
B.Sc. (Nursing, Optometry, Radiographer)	84	59	
Parents' profession			
Doctor	15 (6.1)	15 (6.4)	0.27
Related to healthcare besides Doctor	8 (3.3)	15 (6.4)	
Not related to healthcare	221 (90.6)	204 (87.2)	
Suffering from chronic illness (yes)	13 (5.3)	8 (3.4)	0.31
Reason for self-medication			
Symptomatic relief	199 (81.6)	178 (76.1)	0.14
Diagnostic	26 (10.7)	29 (12.4)	0.55
Preventive	27 (11.1)	33 (14.1)	0.32
As a tonic	6 (2.5)	15 (6.4)	0.04
Self-medication done on advice of			
Friend	51 (20.9)	66 (28.2)	0.06
Chemist	43 (17.6)	56 (23.9)	0.09
Of their own	144 (59.0)	95 (40.6)	<0.001
Others	25 (10.2)	35 (15.0)	0.12
Correct dose was established by			
Personal experience	126 (51.6)	85 (36.3)	0.001
Others' experience	60 (34.6)	85 (36.3)	0.01
Read in book	58 (23.8)	65 (27.8)	0.31
Other	13 (5.3)	15 (6.4)	0.61
Duration of therapy			
As and when required	156 (63.9)	161 (68.8)	0.26
Less than a week	52 (21.3)	35 (15.0)	0.07
More than a week	18 (7.4)	16 (6.8)	0.82
In case of oral antibiotic, full course	69/149 (46.3)	91/136 (66.9)	0.01
Access of medicines			
Market	188 (77.0)	176 (75.2)	0.64
Physician sample	33 (13.5)	29 (12.4)	0.71
Medical representative	17 (7.0)	15 (6.4)	0.81
Health scheme	26 (10.7)	27 (11.5)	0.76
Aware of possible side effects			
Yes	137 (56.1)	142 (60.7)	0.73
No	38 (15.6)	46 (19.7)	
Partially	69 (28.3)	46 (19.7)	
Medication cured the symptoms			
Yes	218 (89.3)	193 (82.5)	0.97
No	5 (2.0)	8 (3.4)	
Partial relief	21 (8.6)	33 (14.1)	
Advise this to others (yes/no)	192/52	178/56	0.49

at one point of time. It is noteworthy that in our study, both medical and paramedical students from all over India were included to capture a comprehensive picture of this practice. In a study conducted in Medical School in the United Kingdom among medical students, it was reported that 39.2% feel that it is appropriate for doctors to self-prescribe.^[13] Similarly, in studies done in USA, 22% of medical students reported using informal care^[14] and 52% of resident doctors were engaged in the practice of self-medication.^[15] In Norway, 54% of the physicians in their fourth and ninth postgraduate years had reported the use of self-prescription in case of illness.^[16] A comprehensive study conducted among medical, pharmacy, and health science students of single medical college in Ethiopia

found the prevalence of this practice to be 38.5%.^[17] Similarly, prevalence among medical students was reported to be 55% from Egypt,^[18] 76.6% in Iran,^[19] and 44.8% in Bahrain.^[20] Hence, it can be inferred that all over the world self-medication is practiced by medical students, in varying degree. However, the frequency varies from Western world to India, which could be due to easy availability of prescription drugs from pharmacies in India.^[3] There is also another larger dimension of prescription drugs being abused by students for self-medication. A study by Benotsch *et al.* found out the lifetime misuse of an over-the-counter medication to be 13.0-18.6% among young adults (age 18-25 years) and this misuse is significantly linked to increased use of illicit substances for abuse purposes.^[21]

Recently, a study established that self-medication is the chief reason for misuse of prescription medication among physicians.^[22]

In our study, this practice of self-medication was not influenced by gender or profession of parents. This is in contrast to previously reported studies from India, which reported higher female predilection for self-prescription among medical students.^[8-10] In addition, a study from the USA concluded that females are at increased risk of prescription drug misuse, due to greater amount of strain in daily lives as compared to their male counterparts.^[23] However, another Indian study had also reported higher self-medication practice among male participants.^[24] There was a statistically significant difference between the different category of students who participated in this study and who practiced self-medication between 2007 and 2012. This was possibly owing to a sampling error with more number of BDS students and less of B.Sc. (Nursing) being administered the questionnaire in 2012 as compared to 2007. This difference disappeared when self-medication practice was analyzed only for MBBS students between 2007 and 2012. However, in both the phases, the proportion of students practicing self-medication was maximum during the 3rd year of their studies probably because the pharmacology curriculum is completed during the 3rd year of study.

Majority of students in both the phases (76.1% in 2012 vs. 81.6% in 2007) took the medications for symptomatic relief and stopped them as soon as symptoms are relieved. However, less number of students took the medicines and decided the correct dosage of their own and relied more on the advice or experience of friends, chemists or others in 2012 as compared to 2007. This is possible because, in the second phase, more number of participants were still in their 2nd year compared to the first phase (i.e., 250/337 in 2012 vs. 182/327 in 2007). Importantly, in both the phases of the study, around half of students were either not aware or partially aware of the adverse effects of the drugs they used for self-medication. This demonstrates the callousness on part of students toward their own health and also raises serious concerns regarding the quality of medical care which they are supposed to provide in future to patients.

Oral anti-inflammatory, oral antibiotics, and oral antipyretics are the major classes of drugs being used for self-medication in both phases of this study. This finding is consistent with previous studies from other parts of the world;^[17-19] however, earlier studies from India have mentioned antipyretics as the most commonly used drug group for self-medication.^[9,10] Majority of the students in both the phases (63.9% in 2007 and 68.8% in 2012) took medicines as long as the symptoms persisted and

stopped them after having symptomatic cure. However, an important change was observed in the practice of taking antibiotics between two phases of the study. Although there was no significant difference in the proportion of students who took antibiotics in both the phases (58.1% in 2012 vs. 61.1% in 2007), a significant increase in the number of students who took the full course of antibiotics irrespective of symptomatic cure in was observed in 2012. The proportion of students who took oral antibiotics in this study is quite high as compared to previously reported studies from India (i.e., 31.1-39.3%)^[8-10] and abroad (i.e., 30.0-58.8%).^[18,25,26] The media coverage of emergence of New Delhi Metallo beta-lactamase-1 enzyme bearing bacteria, which are resistant to most of the known antibiotics; and its relation to India might have created awareness among medical students regarding proper use of antibiotics.^[4] In both the phases of this study, most of the students who self-prescribed got symptomatic relief and further emphasized that they will recommend this practice to others, which itself is a worrying trend. Such practice will be further compounded by the fact that in India, antibiotics are prescribed without appropriate indications and patients often do not complete the full course of the drugs.^[27,28] However, on the brighter side, a shift toward rational self-prescribing was evident from the antibiotic taking patterns of the students in the second phase of the study.

Limitations of the study

Although this is the first Indian study which provides a comprehensive picture of self-medication practice among future healthcare providers (medical and paramedical students) from across the country (39 colleges in 2007 and 38 colleges in 2012), there are certain limitations. First, although a recall period of 1 year was chosen to include the impact of cyclic and chronic ailments, there is a possibility of recall bias, especially for the frequency of self-medication within past 1 year at the time of participation in the study which may lead to wrong assumptions. Second, the categories of participants (medical and paramedical) despite being the same, the actual participants were different during both phases of the study. This was done purposefully to evaluate the behavior of same category of different students at separate time points. Third, most of the participants represented colleges from the North, West, and East Regions of the country because participation from the southern colleges in the annual cultural event organized at our institute in North India is traditionally low.

CONCLUSION

The practice of irresponsible self-medication by medical students can have serious implications as they are the future

healthcare providers. The students are impressionable at this stage of their career, and they carry forward those practices which they acquire during this period. Our finding of students preferring to complete the full course of antibiotics in 2012 in contrast to 2007 is testimony that awareness of rational antibiotic use can positively influence their practices. A separate module on pros and cons of self-medication and drug-induced injury should also be included in the undergraduate medical curriculum. After completion of medical school, the significance of 'responsible self-medication' should be conveyed to physicians by organizing seminars, continuing medical education, and webinars. Along with this, support by the government in curbing the easy availability of medications across the pharmacies in the country can also reduce self-medication practices substantially.

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Conflicts of interest

There are no conflicts of interest.

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