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Self-medication among Indian medical undergraduates: Knowledge, attitude, practice and impact of teaching pharmacology

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Abstract:
Self-medication is a common public health concern, and medical students are particularly prone to it because of their medical knowledge and easy access to medications. Therefore, it is of interest to assess the prevalence, pattern, knowledge and attitudes regarding self-medication among 294 Indian medical students. Overall, 76.9% of students' practised self-medication, with a higher prevalence among first-year students; analgesics and antipyretics were the most commonly used drugs, while antibiotic self-medication was more frequent among first-year students. Minor illnesses such as cough and the common cold were the main reasons for self-medication, with family and friends being the primary sources of information and pharmacies the main source of medicines. Thus, data show that pharmacology education may promote more rational medication practices, particularly by reducing inappropriate antibiotic use, highlighting the need for educational interventions to encourage responsible self-medication.

Keywords: Self-medication, medical students, rational drug use

Background:
Self-medication, the practice of individuals diagnosing and treating their health conditions without consulting healthcare professionals, has become a global concern with significant implications for public health **[1].** Among those who may be particularly vulnerable to the allure of self-medication are medical undergraduates, a group expected to show a high degree of medical knowledge and responsibility. The practice of self-medication is a complex issue with both positive and negative consequences. On one hand, it can empower individuals to manage minor health issues independently, reducing the burden on healthcare systems and improving access to treatment for common ailments. On the other hand, it poses substantial risks, including misdiagnosis, inappropriate drug selection, adverse reactions, drug interactions and the development of antibiotic resistance **[2, 3].** Medical undergraduates, who are immersed in the world of medicine and pharmacology, are expected to possess the knowledge and skills necessary to make informed decisions regarding self-medication **[4].** However, their actual practices and attitudes may vary widely. Understanding the factors that influence self-medication behaviours among medical students is not only important for the well-being of the students themselves but also for the broader healthcare system and society as a whole **[2, 5 and 6].** Effective pharmacology teaching can potentially reduce the risks associated with self-medication, enhance patient safety and promote responsible medication management practices among future healthcare professionals **[7, 8].** Therefore, it is of interest to describe the knowledge, attitude and practice of self-medication among medical undergraduates and evaluate the influence of pharmacology teaching on their self-medication behaviour.

Methodology:
This study was a questionnaire-based exploratory study conducted in 2023. The protocol was reviewed and approved by the Sumandeep Vidyapeeth Institutional Ethics Committee. A self-developed, pre-validated questionnaire consisting of both open-ended and close-ended items was used. The study population comprised first-year and second-year medical students of Smt. B. K. Shah Medical Institute & Research Centre. All medical students in the first and second years who were willing to participate in the study were enrolled. A briefing was given on the voluntary nature of participation in the study, its objectives and the procedure for completing the questionnaire. Informed consent was obtained from each student participating in this study. Data were collected and analysed.

Result:
A total of 294 students voluntarily participated in the study, out of which 196 were first-year MBBS students and 98 were second-year MBBS students. In the present study, we found that 226 (76.9%) out of 294 MBBS students in our institute are practising self-medication; among them, 135 (68.9%) were first-year students and 91 (92.85 %) were second-year students. The most commonly class of drug that students use for self-medication among both first and second year students were Nonsteroidal anti-inflammatory drugs (NSAIDs) 155 (79.01%) & 93 (94.9%) followed by medications for Antihistaminics 32 (16.32%) & 16 (16.32%), Antibiotics 13 (6.6%) & 8 (8.2%), Antacids 12 (6.1%) & 9 (9.1%), Antiemetics 5 (2.5%) & 0 (0%), Vitamins 3 (1.5%) & 1 (1.02%), Antidiarrhoeals & Laxatives 1 (0.5%) & 3 (3.06%) repectively **(Figure 1).** A total of 104 (35.4%) students from the study admitted that they had used antibiotics as self-medication in the past; out of these, 66 (33.7%) were first and 38 (38.7%) were second-year students. The most common conditions for which self-medication was practiced were Cough and cold 155 (79.08%) & 82 (83.7%) followed by Headache 141 (71.9%) & 77 (78.6%), Fever 124 (63.2%) & 78 (79.6%), Diarrhoea & Constipation 79 (40.3%) & 64 (65.3%), Acidity & Vomiting 46 (23.5%) & 37 (37.7%), Skin allergy & Acne 16 (8.2%) & 18 (18.4%), Insomnia 8 (4.1%) & 5 (5.1%) respectively among First year and Second year students (**Table 1**). The most common sources of information regarding drugs were from Family and friends 114 (58.2%) & 64 (65.3%), Pharmacist & other medical staff 80 (40.8%) & 61 (62.2%), Previous illness expertise 37 (18.9%) & 40 (40.8%),

Learning Pharmacology 7 (3.6%) & 34 (34.7%), Advertisements 7 (3.6%) & 9 (9.2%) respectively among First & Second year students **(Figure 2)**. The common source for the procurement of medicine for self-medication reported by both years of students was direct purchase from the pharmacy **(Table 2).** The commonest reason mentioned by students behind practising self-medication was minor ailments in both years; followed by 29.6% first year reported previous expertise and 54.08% second year reported ease and convenience **(Table 3).** 59.7% of first-year students and 96.9% of second-year students have correct knowledge of generic names and trade names **(Table 4).** Among the first-year students, 83.2% & second year, 88.8% of students believe that self-medication is harmful if they are taken without proper knowledge of drugs and disease **(Table 4).**

Table 1: Conditions for which self-medication is practiced

The conditions for which Self-Medication is practiced	First MBBS students (%)	Second MBBS students (%)
Cough and cold	79.08	83.7
Sore throat	57.1	57.1
Headache	71.9	78.6
Fever	63.3	79.6
Diarrhea	29.6	50
Constipation	21	35.7
Gastric problems (epigastric burning and vomiting)	23.5	37.7
Skin allergy and acne	8.2	18.4
Insomnia	4.08	5.1
Bodybuilding	2.6	9.2
Any other (eye, ear, dental and throat infectious)	5.6	11.2

Table 2: Sources of procurement of medicines for self-medication by medical students

Sources of Procurement of Medicines	First MBBS students (%)	Second MBBS students (%)
Purchase from the pharmacy store	73.5	87.8
Family members/friends	35.2	52.04
Remaining medicines from prior illness	17.9	36.7
Free physicians sample	9.2	17.3

Table 3: Reasons for practice of self-medication

Reasons	First MBBS students (%)	Second MBBS students (%)
Minor ailments	55.6	67.3
Previous expertise	29.6	45.9
Quick relief	44.9	51.02
To save time	17.3	37.8
Ease & convenience	24	54.08
Learning opportunity	6.1	4.08
To save money	4.08	20.4
Crowd avoidance	6.6	27.5
Lack of accessibility	2.5	6.1
Others-Free physicians' samples available	5.6	4.08

Table 4: Impact of pharmacology teaching on knowledge, attitude & practice of students regarding self-medication

Knowledge, attitude & practices of self-medication	First MBBS students (%)	Second MBBS students (%)
Knowledge about generic names and trade names	59.7	96.9
Self-medication is harmful if they are taken without proper knowledge of drugs and disease	83.2	88.8
"Self-medication is not completely free of side effects/ADRs"	78.0	87.7
"Self-medication drugs have a tendency to interact with prescription drugs and food"	74.5	80.6
"Some of the drugs which are preferred as self-medication are not safe in pregnancy"	92.9	88.7
Frequency of self-medication in a year		
Once	36.7	20.4
Twice	25.5	26.5
Three times	12.2	21.4
Four times	5.6	11.2
Five or more than five times	19.9	20.4

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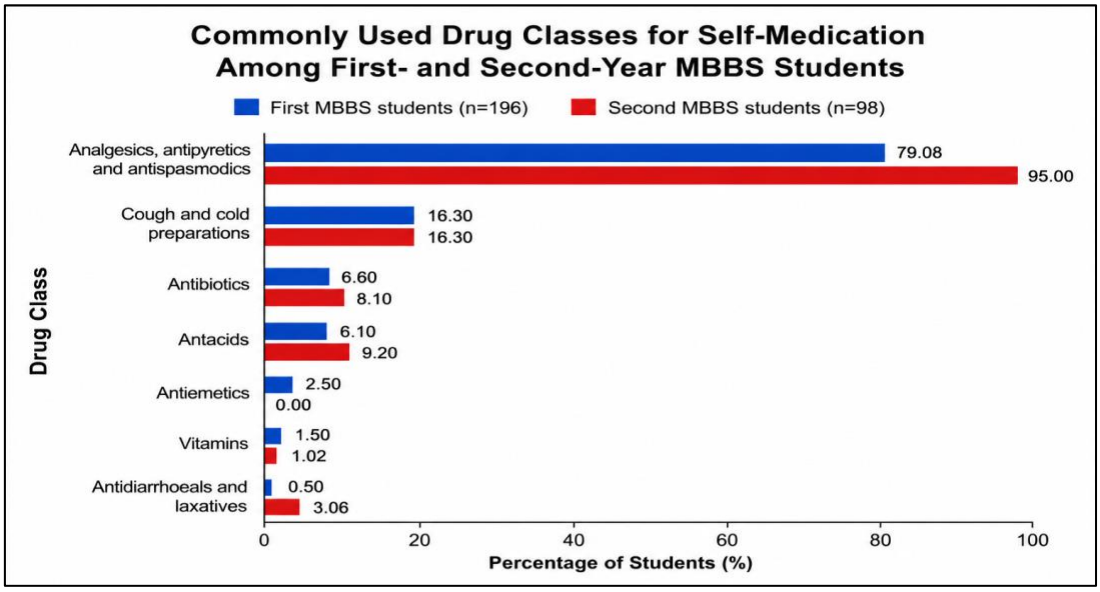

Figure 1: Commonly used drug classes for self-medication among first- and second-year MBBS students

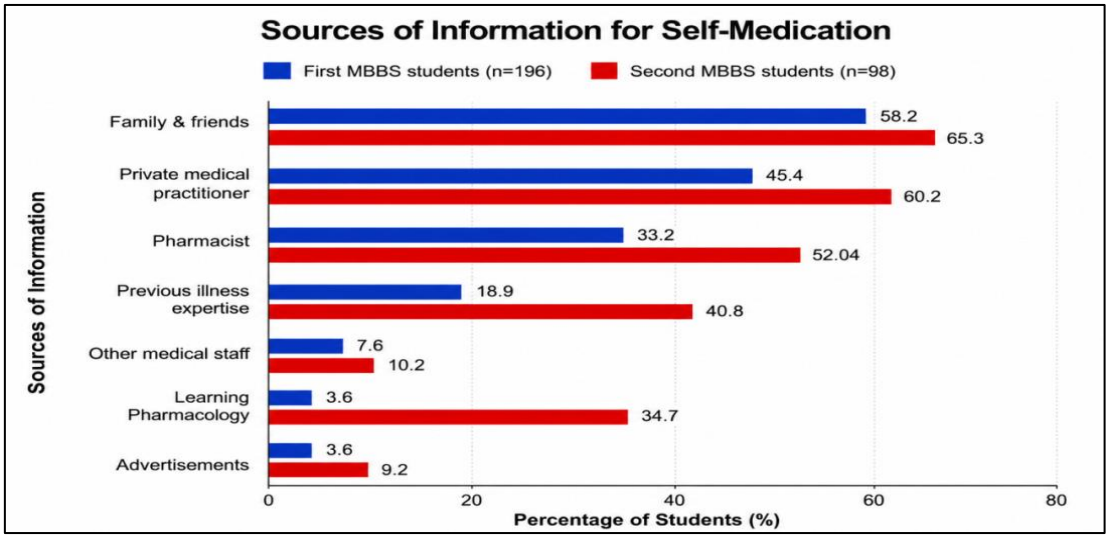

Figure 2: Sources of information for self-medication among first- and second-year MBBS students

Discussion:

Self-medication is a complex practice that is deeply ingrained in society. When done responsibly and with adequate knowledge, it can provide individuals with relief for minor ailments. However, the potential for misuse, misdiagnosis and other risks cannot be ignored. Education, regulation and involvement of healthcare professionals are essential components in achieving a balance between empowerment and safety. In a meta-analysis of 66 studies, they found the prevalence of self-medication was 64.4% **[9].** In our study, we found that overall 76.9% of MBBS students of our institute are practising self-medication. The prevalence of self-medication is 45.9% among first-year students and 30.9 % among second-year students. This finding suggests that education plays a significant role in shaping attitudes and behaviours regarding self-medication. First-year students might be less aware of the potential risks and responsibilities associated with self-medication, leading to a higher prevalence. The second-year students, who received formal education in pharmacology, may have gained a better understanding of medications, their mechanisms of action and the potential risks associated with self-medication. Exposure to pharmacology education may also sensitise second-year students to the importance of consulting healthcare professionals, which is noted in **Figure 2.** The commonly used drugs were Analgesics and antipyretics, followed by cough remedies. This aligns with the typical self-medication behaviour, where individuals often turn to readily available OTC drugs for immediate relief from mild health issues. This finding was similar to the study done by Balan *et al.* **[7].** The data indicating that a total of 104 students had used antibiotics for self-medication, with 66 of them being

first-year students and 38 second-year students, suggests an interesting observation about the influence of pharmacology teaching. Second-year students, with greater exposure to pharmacology coursework, showed a lower prevalence of self-medication with antibiotics **[10].** This could be attributed to a heightened awareness of the potential risks associated with antibiotics and a better understanding of their responsible use. This observation also reinforces the importance of antibiotic stewardship programs in medical education **[11]**. Ensuring that students are well-informed about the consequences of antibiotic misuse can contribute to the reduction of inappropriate self-medication practices, which can lead to antibiotic resistance. The common indications for self-medication were cough and cold, sore throat, fever and headache. These conditions are often perceived as mild and manageable and individuals tend to believe they can alleviate their symptoms without the need for professional medical advice. Many OTC medications, such as antipyretics, analgesics and cough suppressants, are readily available and provide quick relief from these symptoms, contributing to their popularity for self-medication **[12, 13]**. It is essential to promote responsible self-medication by ensuring that individuals have adequate knowledge about the appropriate dosage, potential side effects and possible interactions with other medications. Conditions like cough and cold can sometimes mask more severe health issues that require professional evaluation, so self-diagnosis can sometimes lead to errors in identifying the underlying cause of symptoms. Chronic self-medication, even for mild conditions, may have long-term implications for individual health and contribute to the development of resistance to certain medications. The most common source of information for first-year (58.2%) and second-year (65.3%) students is advice from family and friends. This suggests that interpersonal relationships and informal networks play a significant role in influencing self-medication choices. The percentage of students seeking advice from private medical practitioners increases from the first year (45.4%) to the second year (60.2%). This shift may indicate a growing inclination among students to consult healthcare professionals for guidance as they progress in their medical education. A significant finding is the increase in the second-year students (34.7%) who consider their pharmacology education as a source of information. This shows the impact of formal education on students' self-medication practices and emphasises the role of academic programs in shaping responsible medication use. The sources of medicine procurement among MBBS students are diverse. The most common source for both first-year (56.6%) and second-year (82.6%) students to procure medicines is purchasing them from a pharmacy store. This trend suggests that students generally acquire medications through conventional channels, indicating adherence to regulations and access to professional guidance from pharmacists which is similar to findings of Easwaran *et al*. **[14].** This is a positive finding as it implies that students are obtaining medications from reputable sources. A significant percentage of students in both first-year (26.02%) and second-year (49%) report obtaining medicines from family members or friends. While this source can be convenient and cost-effective, it may raise concerns about the potential sharing of prescription medications, which can lead to risks and misuse. A substantial proportion of both first-year (55.6%) and second-year (67.3%) students cited "minor ailments" as a reason for self-medication. This reflects the common tendency for individuals to seek self-care for conditions they perceive as mild and manageable. A significant percentage of second-year students (54.08%) cited "ease and convenience" as a reason, highlighting the growing importance of convenience in their self-medication choices. While self-medication can offer convenience and quick relief for minor ailments, it also carries inherent risks, especially when driven by a lack of accessibility or inadequate medical knowledge. Nearly 30% of first-year and 45.9% of second-year students mentioned "previous expertise" as a reason. This suggests that students may rely on their medical knowledge to self-diagnose and treat conditions they believe they understand well. These findings are similar to the study by Patel *et al.*, Gyawali *et al.* and Sajith *et al.* **[15-17].** Knowledge regarding generic and trade names of medicines was substantially better among second-year students than first-year students, reflecting the effect of pharmacology training. In addition, most students in both groups recognised that self-medication without adequate knowledge is harmful, indicating an overall positive attitude towards responsible medicine use.

Conclusion:

Self-medication was highly prevalent among Indian MBBS students. The lower prevalence of antibiotic self-medication and better drug knowledge among second-year students suggest that pharmacology education positively influences self-medication practices. Strengthening educational interventions and promoting rational drug use may further reduce inappropriate self-medication among future healthcare professionals.

Conflicts of interest: None

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