



A CROSS-SECTIONAL STUDY ON USE OF OVER-THE-COUNTER MEDICATIONS AMONG UNDERGRADUATE MEDICAL STUDENTS

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Abstract

Background: Over-the-counter (OTC) medications are widely used for self-medication due to their easy availability and perceived safety. Medical students are particularly vulnerable to OTC drug use because of partial pharmacological knowledge, academic stress, and easy access to medicines.

Objective: To assess the prevalence, patterns, indications, and awareness regarding the use of over-the-counter medications among undergraduate medical students.

Methods: A questionnaire-based cross-sectional study was conducted among undergraduate medical students of a tertiary care teaching hospital. Data on frequency of OTC drug use, drug categories, indications, sources of information, and awareness of adverse effects were collected and analyzed using descriptive statistics.

Results: Over-the-counter drug use was common among the participants, with 55% reporting use once every few months. Cold and cough preparations (64.4%) and analgesics (53.10%) were the most frequently used medications. The predominant indications were cold and cough (66%) and fever (60.7%). Earlier personal experience (67%) and advice from friends and family (46.5%) were the major influencing factors. Although 68% of students were aware of potential adverse effects, inappropriate self-medication practices were still prevalent.

Conclusion: The high prevalence of OTC drug use among undergraduate medical students highlights the need for strengthened pharmacology-based education focusing on rational drug use, drug safety, and responsible self-medication practices.

Keywords: Over-the-counter drugs; Self-medication; Drug use; Medical students; Rational pharmacotherapy.

Introduction

Over-the-counter (OTC) drugs are medications that can be obtained without a valid prescription and are intended for use in the treatment of self-recognized illnesses when taken according to labelled instructions ^[1]. Globally, the practice of self-medication using OTC drugs has increased due to factors such as easy accessibility, aggressive pharmaceutical advertising, increased health awareness, and a tendency to avoid medical consultation for minor ailments ^[2]. While responsible self-medication can reduce healthcare costs and improve access to treatment, inappropriate OTC drug use poses significant pharmacological risks including adverse drug reactions, drug–drug interactions, masking of serious underlying diseases, and the development of antimicrobial resistance ^[3,4].

Medical students represent a unique and vulnerable population with respect to OTC drug use. Exposure to pharmacology during undergraduate training may lead to a perceived sense of competence, encouraging self-diagnosis and unsupervised medication use ^[5]. Several studies conducted in India and other countries have reported a high prevalence of self-medication and OTC drug use among medical students, particularly for conditions such as fever, headache, pain, and upper respiratory tract infections ^[6,7,8]. Analgesics, antipyretics, antihistamines, vitamins, antacids, and cold and cough preparations are among the most commonly used OTC drugs in this group ^[9].

From a pharmacological perspective, irrational use of OTC drugs among medical students is a cause for concern. Improper dosing, prolonged duration of use, polypharmacy, and the consumption of fixed-dose combination products—especially cold and cough formulations—can increase the risk of toxicity and adverse drug reactions ^[10]. Analgesics and non-steroidal anti-inflammatory drugs (NSAIDs), when used irrationally, are associated with gastrointestinal, renal, and cardiovascular adverse effects ^[11]. In addition, unsupervised use of antibiotics as OTC medications contributes significantly to the growing problem of antimicrobial resistance, a major public health threat ^[12].

In the Indian setting, OTC drug use is further facilitated by the absence of a clearly defined OTC drug list, easy availability of prescription-only medicines without adequate regulation, and limited enforcement of drug control policies ^[12,13,14]. Sociocultural factors, prior experience with medications, peer influence, and cost considerations also play an important role in promoting self-medication practices among students ^[13]. Although medical students may possess theoretical knowledge about drugs, this knowledge does not always translate into rational and safe medication practices.

Several Indian studies have reported widespread use of over-the-counter medications among medical students despite reasonable awareness regarding drug safety and rational drug use practices ^[16,17,18]. Understanding the patterns, determinants, and awareness related to OTC drug use among undergraduate medical students is essential for designing targeted educational interventions. Early identification of inappropriate self-medication behaviors can help in reinforcing the principles of rational pharmacotherapy and responsible drug use during undergraduate training. Therefore, present study was conducted to assess the prevalence, patterns, indications, and awareness regarding the use of over-the-counter medications among undergraduate medical students using a questionnaire-based cross-sectional design. This article aims to analyze the patterns of OTC drug use among undergraduate medical students, evaluate their knowledge and awareness about drug safety, and highlight the need for targeted pharmacology-driven educational interventions to promote rational drug use.

Objectives

1. To evaluate the patterns, indications and knowledge regarding OTC drugs use among undergraduate medical students in tertiary care hospital.
2. To determine the frequency and types of OTC drugs used by undergraduate medical students.
3. To assess the students' awareness of the risks associated with OTC drug use, including potential side effects and interactions.

Methods

Study design and setting

A questionnaire-based **cross-sectional study** was conducted among undergraduate medical students at **Rajarajeswari Medical College and Hospital**, a tertiary care teaching institution.

Study population

The study population included **MBBS students from all four academic years**.

Inclusion criteria

- Undergraduate medical students enrolled in MBBS (all four years)
- Students willing to participate in the study

Exclusion criteria

- Students who were absent at the time of data collection
- Students unwilling to participate in the study

Sample size and sampling technique

The sample size was calculated using **Yamane's formula** for finite populations ^[15]. A total of **290 students** were included using a convenience sampling method.

Study instrument

Data was collected using a **structured, self-administered questionnaire** developed after reviewing relevant published literature on over-the-counter (OTC) drug use among medical students ^[16,17,18].

The questionnaire included questions assessing:

- Frequency and pattern of OTC drug use
- Common indications for use
- Categories of OTC medications consumed
- Sources of information influencing drug selection
- Awareness regarding adverse drug reactions, drug interactions, and safe dosage

Data collection procedure

The questionnaire was distributed to eligible participants after explaining the purpose of the study. Participation was voluntary, and confidentiality of responses was assured. Students were instructed to complete the questionnaire independently without discussion.

Ethical considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee. Consent was taken from all participants prior to data collection.

Statistical analysis

Collected data were entered into **Microsoft Excel** and analyzed using **Statistical Package for the Social Sciences (SPSS) version 21.0**. Descriptive statistics were used, and qualitative results were expressed as **frequencies and percentages**.

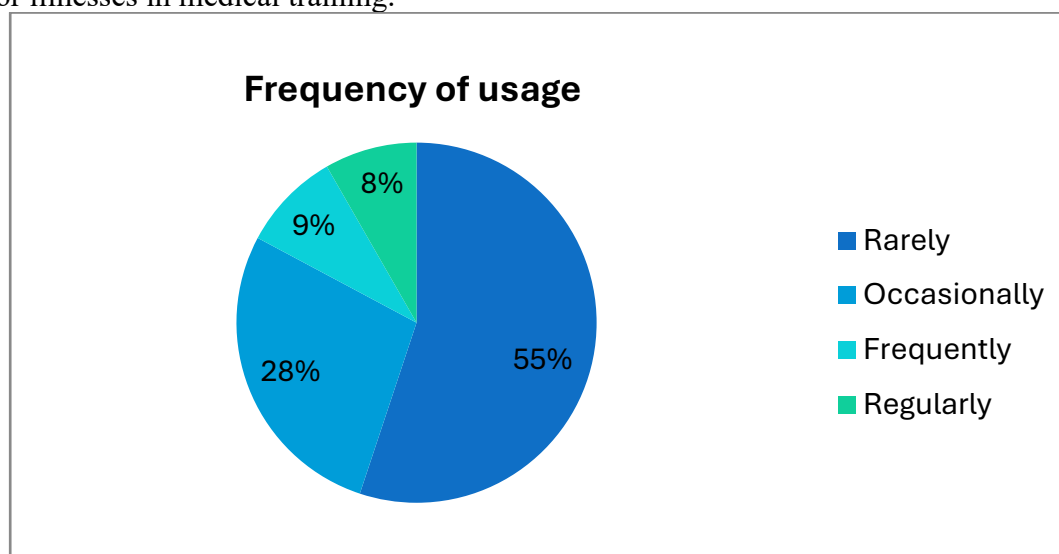
Results

Demographic Characteristics

A total of 290 undergraduate medical students participated in the study, females were the majority (66%), while males accounted for (34%) of participants.

Pattern and Frequency of OTC Drug Use

Use of over-the-counter medications was common among the participants. About **55% of students reported using OTC drugs once every few months**, indicating regular reliance on self-medication for minor illnesses in medical training.



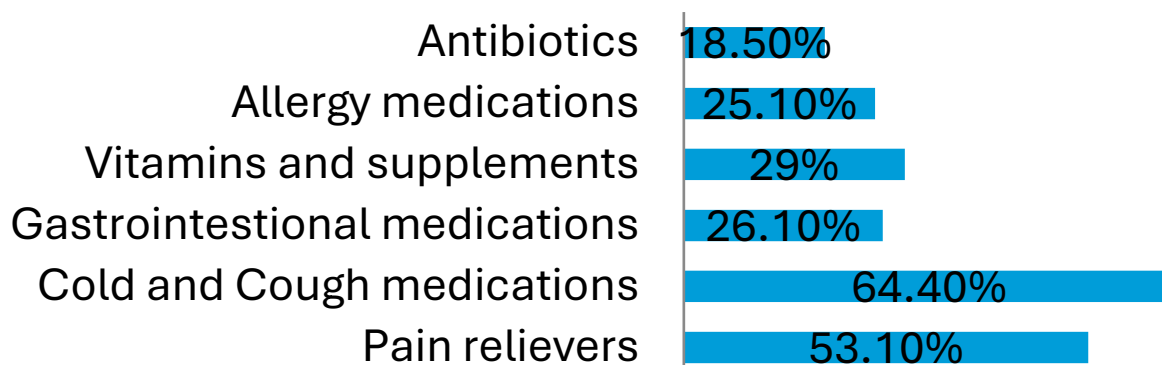
Commonly Used OTC Drug Categories

The most frequently used OTC medications were:

- Cold and cough preparations (64.4%)
- Analgesics and pain relievers (53.10%)

Commonly used OTC drugs

Commonly used OTC drugs



These drug classes are associated with significant pharmacological considerations, including inappropriate dosing, combination therapy risks, and adverse effects with prolonged use.

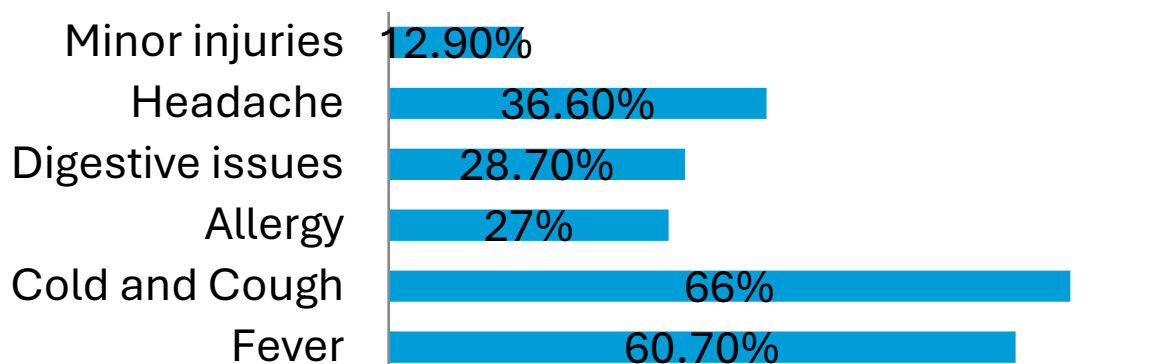
Indications for OTC Drug Use

The predominant indications included:

- Cold and cough symptoms (66%)
- Fever (60.70%)

Common indications for which OTC Drugs are used

Common indications for which OTC Drugs are used



These findings suggest that upper respiratory tract symptoms and febrile illnesses are major drivers of OTC drug consumption among medical students.

Knowledge, Awareness, and Decision-Making Factors

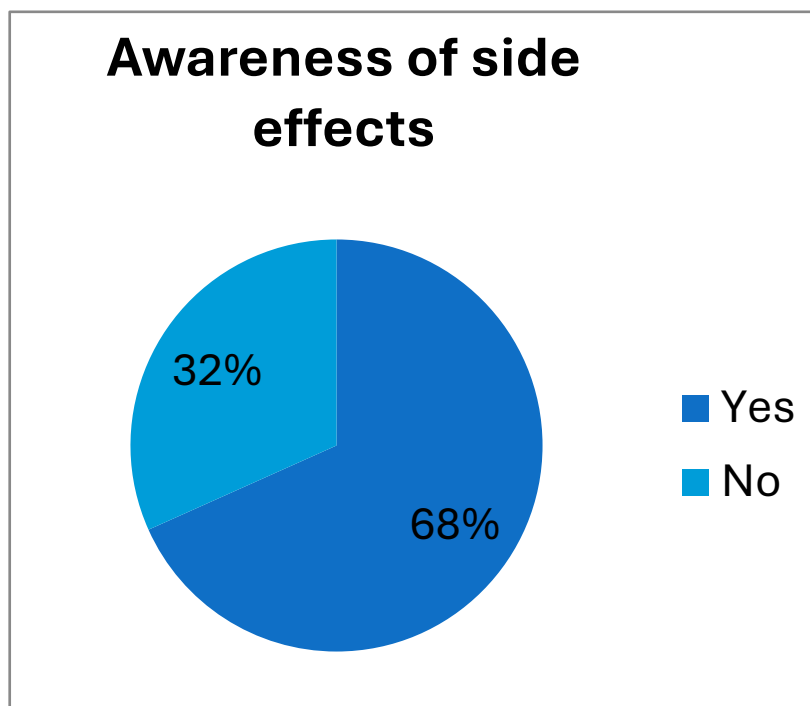
Most students preferred OTC drugs based on:

- Earlier personal experience (67%)

- Recommendations from friends and family (46.5%)

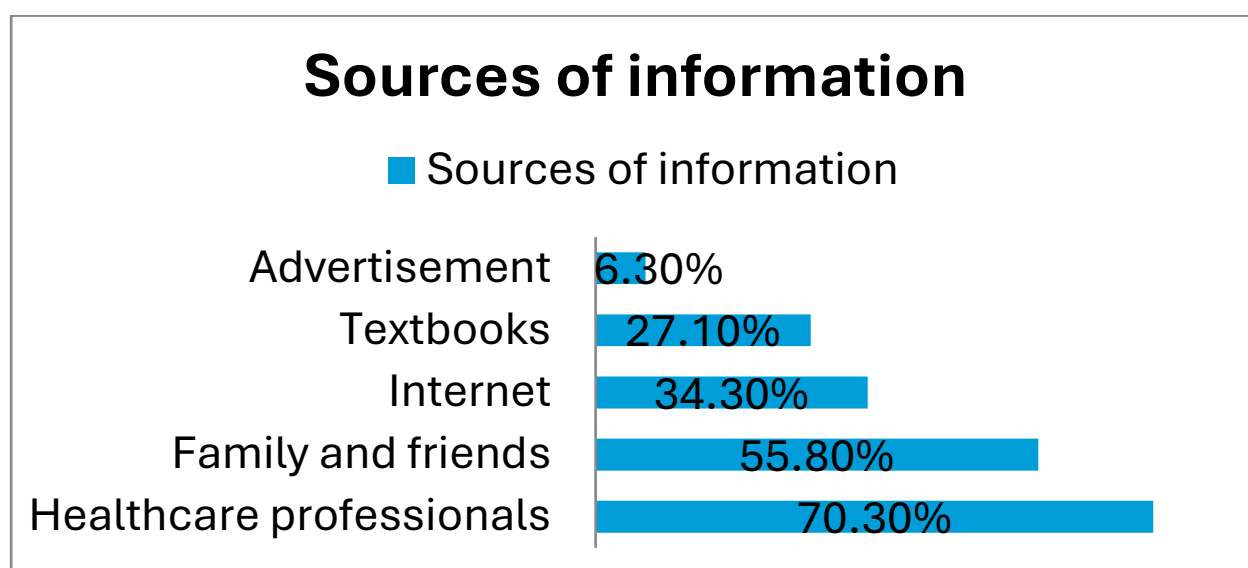
Knowledge and awareness of side effects

Although 68% of students reported awareness of potential adverse effects, reliance on non-professional advice remained large, showing a gap between pharmacological knowledge and safe practice.



Sources of Information

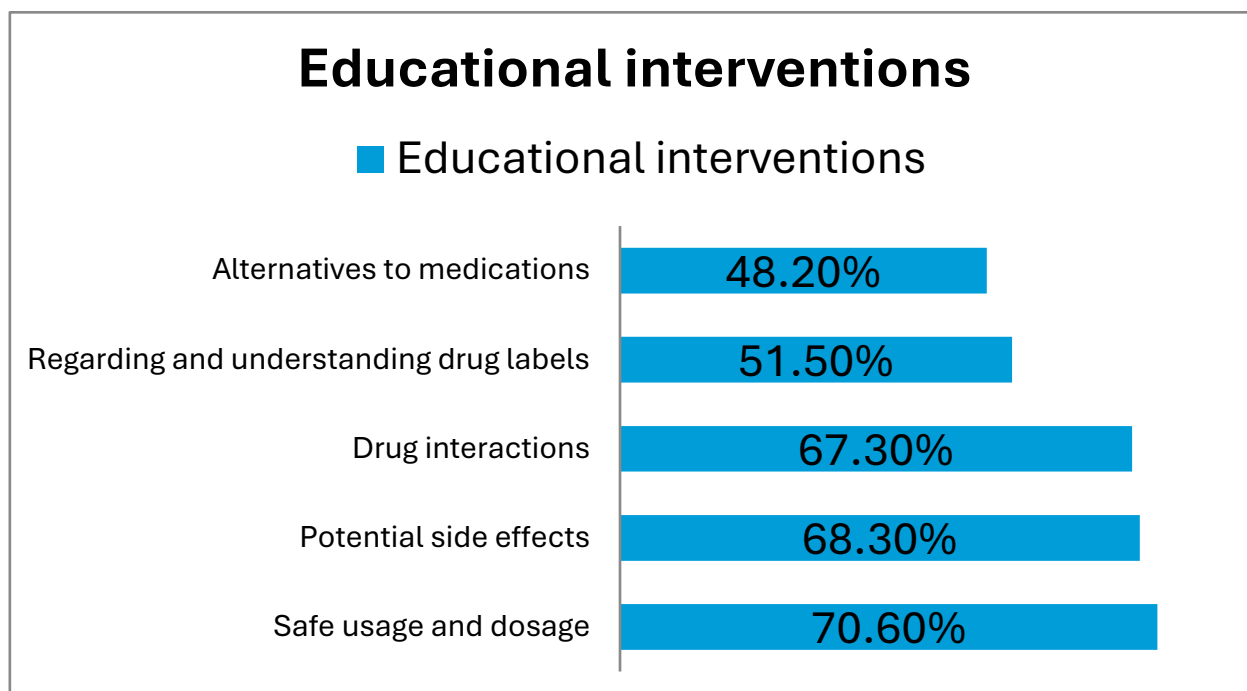
Health-care professionals were identified as the most common source of information (70.3%), followed by friends and family (55.8%). However, 71.4% of students considered their sources to be reliably informative, highlighting variability in perceived credibility.



Education Intervention

Around 92.8% of students were interested in learning about OTC drugs and most of the students had knowledge about safe use of these drugs along with their potential side effects and drug interactions.

Around 81.40% of the students have a good knowledge about safe usage and dosage of the drugs and 68% have knowledge about the potential side effects and also 67.30% students were aware about the drug interactions.



Discussion

The present cross-sectional study highlights a **high prevalence of over-the-counter (OTC) medication use** among undergraduate medical students, reflecting a pattern consistently reported in medical education and pharmacology literature. The frequent reliance on OTC drugs for minor ailments such as cold, cough, fever, and pain observed in this study is comparable with findings from earlier studies conducted among medical students in India and other countries ^[10,18]. This trend may be attributed to easy access to medications, academic stress, time constraints, and perceived confidence arising from partial medical knowledge.

Cold and cough preparations and analgesics were the most commonly used OTC drug categories in the present study. Similar patterns have been reported in studies by Badiger et al. and Sood et al., where these drug classes dominated self-medication practices among medical students ^[6,17]. From a pharmacological standpoint, the use of combination cold and cough formulations is particularly concerning, as these products often contain multiple active ingredients such as antihistamines, decongestants, antitussives, and analgesics. Inappropriate dosing or prolonged use of such combinations may increase the risk of adverse drug reactions, sedation, cardiovascular effects, and drug–drug interactions ^[19].

Analgesic use, particularly non-steroidal anti-inflammatory drugs (NSAIDs), was also commonly reported in this study. Irrational NSAID use without medical supervision has been associated with gastrointestinal, renal, and cardiovascular adverse effects, especially when used repeatedly or for prolonged durations ^[20]. The widespread availability of these drugs as OTC medications further amplifies the potential for misuse among medical students.

The predominant indication for OTC drug use in this study is upper respiratory tract symptoms, fever, and headache which is comparable to findings from studies conducted among medical and dental students in India and other countries ^[10,18]. These conditions are often perceived as minor and self-limiting, which may discourage students from seeking professional medical advice. However, repeated self-treatment of such symptoms may delay appropriate diagnosis and management of underlying conditions.

Despite a substantial proportion of students reporting awareness regarding adverse drug reactions, drug interactions, and safe dosage, **inappropriate self-medication practices persisted**. This disconnect between theoretical knowledge and actual practice has been reported in several previous studies and may be attributed to overconfidence arising from partial medical training ^[5,11,12]. Reliance on prior personal experience and advice from friends and family, as observed in the current study, further highlights this gap.

Health-care professionals were identified as an important source of information for OTC drug use; however, a considerable proportion of students continued to rely on non-professional sources. Similar observations have been reported in studies by Parikh et al. and Oviya et al., emphasizing the need to strengthen evidence-based decision-making skills among medical students ^[7,8]. Encouragingly, a majority of participants expressed interest in learning more about OTC medications, indicating receptiveness to targeted educational interventions.

Overall, the findings of the current study underscore the importance of reinforcing **rational pharmacotherapy, pharmacovigilance, and responsible self-medication practices** during undergraduate medical education. Integrating practical training on OTC drug safety and rational use into the medical curriculum may help bridge the gap between knowledge and practice and reduce the long-term public health risks associated with irrational drug use.

Limitations

This article is based on data derived from a single cross-sectional study conducted among undergraduate medical students in one institution, which may limit generalizability. Self-reported data are subject to recall bias and social desirability bias. Despite these limitations, the article offers valuable insights into pharmacological patterns of OTC drug use in a key target population.

Conclusion

The findings of this study demonstrate a **high prevalence of over-the-counter medication use** among undergraduate medical students, predominantly for minor ailments such as cold, cough, fever, and pain. Although a considerable proportion of students were aware of adverse drug reactions, drug interactions, and safe dosage practices, **inappropriate self-medication behaviours persisted**, largely influenced by prior experience and non-professional advice.

These findings highlight a gap between pharmacological knowledge and rational drug use practices among future healthcare professionals. Strengthening undergraduate pharmacology education with focused training on **rational pharmacotherapy, pharmacovigilance, and responsible self-medication** is essential. Early educational interventions may help promote safe OTC drug use and prevent long-term public health consequences associated with irrational medication practices.

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References

1. World Health Organization. **Guidelines for the regulatory assessment of medicinal products for use in self-medication**. Geneva: WHO; 2000.
2. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self medication. **Drug Saf.** 2001;24(14):1027–1037.
3. Ruiz ME. Risks of self-medication practices. **Curr Drug Saf.** 2010;5(4):315–323.
4. Bennadi D. Self-medication: A current challenge. **J Basic Clin Pharm.** 2013;5(1):19–23.
5. James H, Handu SS, Al Khaja KAJ, Otoom S, Sequeira RP. Evaluation of the knowledge, attitude and practice of self-medication among first-year medical students. **J Clin Diagn Res.** 2016;10(11):FC01–FC04.
6. Badiger S, Kundapur R, Jain A, et al. Self-medication patterns among medical students in South India. **Australas Med J.** 2012;5(4):217–220.
7. Parikh D, Sattigeri BM, Kumar A, Brahmabhatt S. A survey on OTC drug use among medical, nursing, and clerical staff of a rural teaching hospital. **Int J Res Med Sci.** 2013;1(2):83–86.

8. Oviya VJ, Lakshmi T. Knowledge and practices of over-the-counter medications among dental students. **Int J Curr Adv Res.** 2017;6(4):3057–3059.
9. Rekha MS. A study on the use of over-the-counter drugs among first-year medical students. **J Pharmacol Toxicol Stud.** 2015;3(1):20–24.
10. Banerjee I, Bhadury T. Self-medication practice among undergraduate medical students in a tertiary care medical college. **J Postgrad Med.** 2012;58(2):127–131.
11. Osemene KP, Lamikanra A. A study of the prevalence of self-medication practice among university students in Southwestern Nigeria. **J Public Health Afr.** 2012;3(2):e6.
12. Ibrahim NK, et al. Self-medication with antibiotics among medical students. **J Infect Public Health.** 2015;8(5):465–470.
13. Ahmad A, et al. Evaluation of self-medication practices in India. **J Pharm Bioallied Sci.** 2014;6(2):93–99.
14. Central Drugs Standard Control Organization (CDSCO). **Drug regulation and control in India Act**, 1940.
15. Yamane T. **Statistics: An Introductory Analysis.** 2nd ed. New York: Harper and Row; 1967.
16. Subramanian S, Satyanarayana V, Bhandare B. A study on knowledge and practices of over the counter medications among 2nd year medical students. **Int J Basic Clin Pharmacol.** 2015;4(7):1074-81.
17. Sood M, Bajaj JK, Grewal N. Evaluation of use of over-the-counter drugs among medical students in a tertiary care teaching hospital. **Int J Basic Clin Pharmacol.** 2019;8(5):973–976.
18. Shankar PR, Partha P, Shenoy N. Self-medication and non-doctor prescription practices in Pokhara Valley, Western Nepal. **BMC Fam Pract.** 2002;3:17.
19. Šimundić AM, Filipi P, Vrtarić A, et al. Patient's knowledge and awareness about the effect of over-the-counter drugs and dietary supplements on laboratory test results. **Clin Chem Lab Med.** 2019;57(2):183–194.
20. Grosser T, Smyth E, FitzGerald GA. Anti-inflammatory, antipyretic, and analgesic agents. In: Brunton LL, Hilal-Dandan R, Knollmann BC, editors. **Goodman & Gilman's The Pharmacological Basis of Therapeutics.** 13th ed. New York: McGraw-Hill; 2018.