REVIEW | OPEN ACCESS

Medical Science

To Cite:
Shahid S, Zulfiqar K, Butt K, Yousaf I, Shabbir A, Zaheer E, Fatima N, Amjad U, Majeed A, Ali W, Munir T, Qaiser M, Sabri MSS, Iqbal MZ. Systematic review of the self-medication practice among medical students across South Asian countries. *Medical Science* 2024; 28: e23ms3314
doi:

Authors' Affiliation:
[1]Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Lahore University of Biological & Applied Sciences, Lahore, Pakistan
[2]Research Student, Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Lahore University of Biological & Applied Sciences, Lahore, Pakistan

*Corresponding Author
Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Lahore University of Biological & Applied Sciences, Lahore, Pakistan
Email: drmmziqbal@gmail.com

Peer-Review History
Received: 03 January 2024
Reviewed & Revised: 06/January/2024 to 20/March/2024
Accepted: 23 March 2024
Published: 27 March 2024

Peer-review Method
External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367

DISCOVERY SCIENTIFIC SOCIETY

Systematic review of the self-medication practice among medical students across South Asian countries

Sara Shahid[1], Komal Zulfiqar[2], Khadija Butt[2], Iram Yousaf[2], Alvina Shabbir[2], Eman Zaheer[2], Neha Fatima[2], Umair Amjad[2], Arooj Majeed[2], Wasiq Ali[2], Tasmia Munir[2], Mahnoor Qaiser[2], M Sohaib Sultan Sabri[2], Muhammad Zahid Iqbal[1*]

ABSTRACT

Background: Self–medication is the act of using pharmaceuticals without consulting a doctor, though a universal definition is still problematic. Humans believe that their health is their own responsibility. Therefore, they self-medicate to safeguard and maintain their own health. Prevalence of self-medication is high across SOUTH ASIAN countries. The reason to take self-medication is the lack of interaction to the physician and availability of OTC in pharmacies without prescription. People usually self-medicate over the counter drugs and dietary supplements to relieve symptoms of mental discomfort, tension and pain. *Aims & Objectives:* The aim of the study is to determine the prevalence of self-medication use and factors of self-medication practice among the patients. To determine the disease condition, category of drugs being used and the conditions which causes ADRS. *Material & Method Study Design:* Primary sources for this review were Pubmed and Cochrane. Study protocols follow PRISMA Flow statement. Research conducted based on English language. It has two criteria including Inclusion Criteria and Exclusion criteria. *Conclusion:* Thus, it is concluded that SOUTH ASIAN countries have a high frequency of self-medication which is linked to the inappropriate use of drugs. Thus, we should develop measures to lower the drug related health risks among these countries. The problem of non-prescription medication usage can be lessened with the implementation of educational initiatives at both levels; general public and health care professionals, as well as the enforcement of laws governing antibiotic non-prescription use.

Keywords: Self-medication, Medical students, South Asian countries, OTC Drugs, Non-prescription drugs.

1. INTRODUCTION

Self-medication can be described as the act of using pharmaceuticals either independently or upon suggestion from others without consulting a healthcare professional, although establishing a universally accepted definition remains challenging (Inder et al., 2018). According to the World Health Organization, self-medication entails individuals choosing and utilizing medicines, including herbal and traditional remedies, to address self-perceived illnesses or symptoms. It also encompasses the occasional or ongoing use of medications initially prescribed by a physician for chronic or recurring conditions (Chindhalore et al., 2020). Self-medication involves independently using prescription drugs, refilling prescriptions based on prior usage, or sharing medications with acquaintances or family members (Bukhari et al., 2022).

As the cost of healthcare escalated and the prevalence of chronic non-communicable diseases rose, the practice of responsibly using over the counter (OTC) medications as part of self-care, alongside activities such as hygiene, nutrition, and exercise, became more prevalent (Patil et al., 2017). The World Health Organization (WHO) has introduced the term "responsible self-medication", referring to the procurement and usage of OTC medications in accordance with prescribed guidelines for treating minor ailments (Shahid et al., 2023). Engaging in responsible self-medication promotes overall health by empowering individuals to address minor health concerns effectively. For self-medication to be effective and safe, patients must assume full responsibility, akin to that of a competent doctor. This includes accurately identifying diseases or symptoms, administering the correct dosage, understanding potential outcomes, and taking precautionary measures to prevent side effects and associated disorders (Patil et al., 2017).

Self-medication constitutes a crucial aspect of patients' self-care, serving as the primary recourse for addressing common health issues that do not warrant professional medical attention (Seam et al., 2018). In situations where resources are limited, appropriate self-medication proves to be both time and cost-efficient, offering relief from minor ailments (Shrestha et al., 2021). Additionally, the advantages of self-medication extend to the convenience and autonomy it affords individuals in managing or alleviating minor symptoms or conditions (Islam and Hossain, 2019). Approximately 300,000 individuals are shielded from emphysema, lung cancer, and stroke risks with the aid of over-the-counter (OTC) cessation products (Shahid et al., 2023). While the World Health Organization (WHO) advocates for self-medication in treating mild ailments, it also cautions against its pitfalls, such as adverse side effects and the development of pathogen resistance (Malik et al., 2019).

Self-medication is associated with a range of issues including incorrect diagnoses, hazardous drug interactions, drug abuse or dependency, antibiotic resistance, adverse pharmacological reactions, and polypharmacy (Inder et al., 2018). Antimicrobial resistance significantly undermines the efficacy of antibiotics (Shahid et al., 2023). Self-medication exerts a substantial impact on the healthcare sector due to its dual nature of positive and negative consequences (Islam and Hossain, 2019). Moreover, self-medication may heighten the risk of drug interactions and disease progression (Chindhalore et al., 2020). Self-medication presents various adverse effects, such as allergic reactions, dependence, and potentially severe or fatal outcomes. Consequently, diagnosing conditions can become challenging for clinicians due to self-medication practices, which, for instance, involve the use of NSAIDs and heighten the risk of stroke (Khan et al., 2018).

Globally, the prevalence of self-medication is notably high, with rates approximately reaching 68.07% in Europe, 92% in Kuwait, 31.02% in India, and 59.4% in Nepal. In Pakistan, research indicates a confirmed incidence of around 51.02% (Shahid et al., 2023). Across Asia, the prevalence varies widely, spanning from 4% to 75%, while it stands at a mere 3% in northern Europe (Alam et al., 2015). A meta-analysis conducted in 2014 revealed that adolescents in South American and European countries practiced self-medication between 4% to 92% of the time (Rathish et al., 2017). Moreover, the utilization of self-medication ranges from 32.5% to 81.5% across both urban and rural communities (Pandya et al., 2013).

In developed countries, NPM (non-prescription medicine), encompassing over-the-counter medications, is reportedly utilized by between half and two-thirds of the population (Bhandari et al., 2018). Non-prescription or over-the-counter (OTC) medications, typically available at pharmacies without a prescription, are commonly used for self-medication (Bhandari et al., 2018). Analgesics are the most commonly utilized class of drugs purchased over the counter to alleviate various types of pain. These include nonopioids such as aspirin, ibuprofen, and diclofenac, as well as opioids such as morphine and pethidine (Chindhalore et al., 2020). Self-medication extends beyond OTC medications and may also involve the use of prescription drugs, such as antibiotics, particularly in countries with lenient regulations and unrestricted access to prescription medications.

2. MATERIAL AND METHOD

The main sources utilized for this review were PubMed and Cochrane. The study protocols adhered to the PRISMA flow statement recommendations. The search for research studies involved using keywords such as 'self-medication', 'medical students', 'South Asian countries', and '2010-2023'. Besides, various electronic databases were employed, along with manual searches on Google Scholar, to gather relevant research for this review. Numerous research projects were considered, with inclusion criteria focusing on studies conducted in English and examining self-medication between 2010- 2020. The studies of south asian countries were taken.
The studies were on self medication.
The studies with cross-sectional design were included.
The studies were in English language.

Exclusion Criteria

The following were the exclusion criteria:
The studies on non medical students and general population.
The studies on other than South Asian countries.
The researches that were written in languages other than English.
The studies with other than cross-sectional design.
The studies conducted before the year 2010.

Data Extraction

The data extracted from the included studies were comprised author details, year of the study, country of the study, mean age, gender, departments of medical students in the included studies, study design, indications, sources and reasons of self-medication.

3. RESULTS

Through an electronic database search, 65 unique study articles were identified, out of which 60 studies were scrutinized after eliminating rejected and duplicate information. Six records that did not align with the necessary keywords were excluded, resulting in 54 study reports remaining on the shortlist. Upon further examination for full-text publications, it was discovered that 12 studies among the 54 research articles were conference proceedings (abstracts) published in special editions or issues of journals and were not available in full text. Therefore, 42 studies were left for additional assessment after eliminating these conference abstracts. Among the 42 shortlisted studies, 30 were evaluated for the current systematic review, while 12 were excluded as they did not meet the inclusion criteria. The PRISMA flow diagram (Figure 1) provides a detailed overview of this process. Most of the included studies had appropriate sample sizes and study designs. Their findings were consistent and well-defined. Additionally, none of the research included in this systematic review showed any indications of conflict of interest.

Study Characteristics

The details of authors, setting (institute and country) of research, study design, time interval of data collection, sampling technique, sample size, students' category, age and gender of students, complains, medication being used, sources of information/medicine and reasons for medication were analysed. All 30 included studies were conducted in South Asia, of which most of these were in India which were 14, 6 in Pakistan, 5 in Nepal, 4 in Bangladesh and only 1 in Sri Lanka. Almost all of these were cross sectional studies and sampling technique used was questionnaire. The total population of these studies was 9070 which included the students of MBBS, BDS, DPT, Pharmacy, Nursing and Allied sciences and Health science. The age of the students lies between the range from 19.32 ± 0.82 years to 23.2 ± 1.6 years. Prevalence of self-medication is 14% in South Asia; 13% in US; 11% in Australia and Germany; 9% in Spain, UK, and Sweden; 8% in Switzerland, Mexico and Italy (Bennadi, 2013).

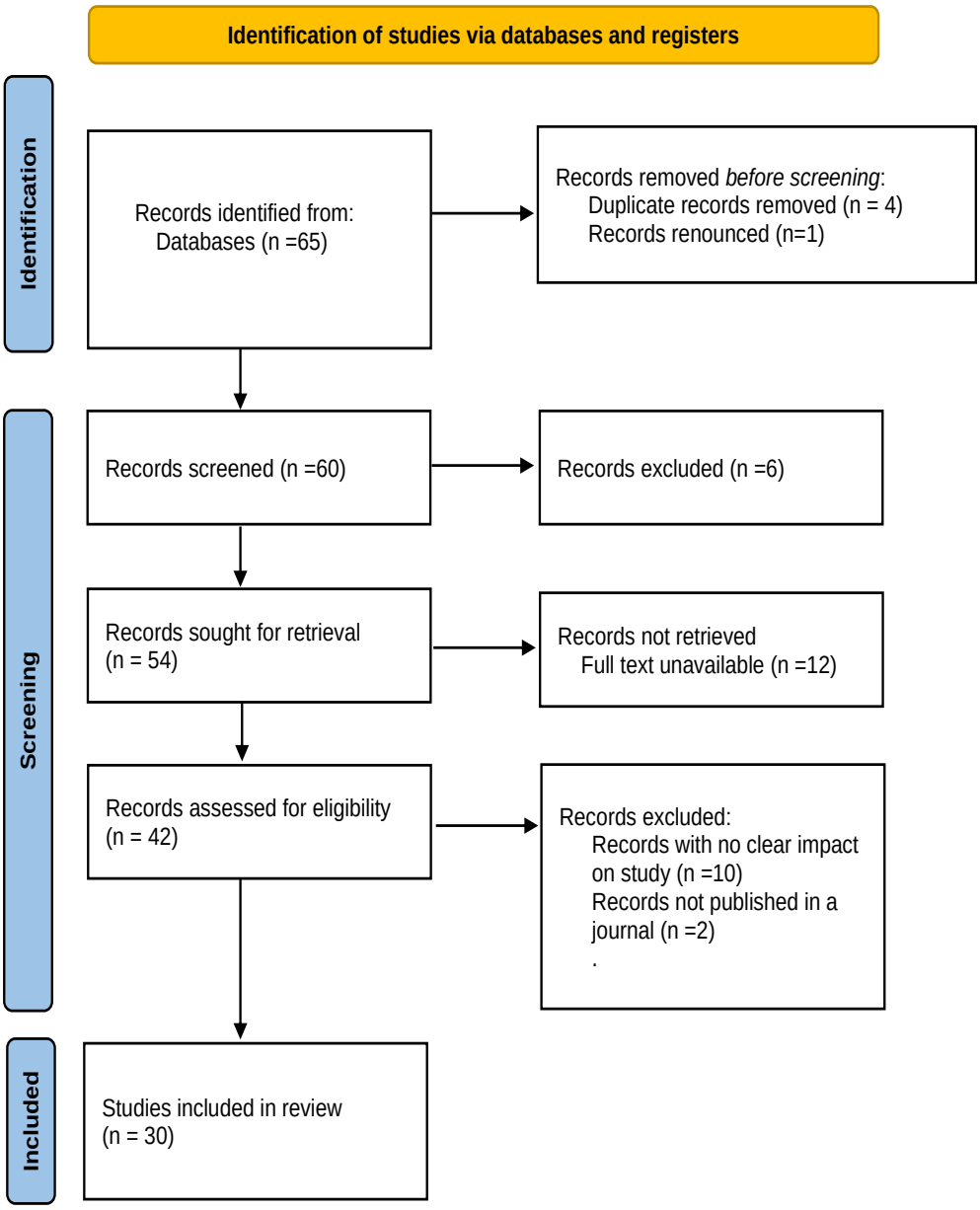

Figure 1 PRISMA flow diagram for systematic review

According to several studies, between 88 and 95% of medical students self-medicate, with self-medication approximately equally prevalent in both sexes (Bukhari et al., 2022). Incidence of self-medication among medical students of Karnataka, India was reported to be as high as 88.18% as well as, 76% in Karachi, 65.2% in Bangladesh (Islam and Hossain, 2019). Suggested by pharmacist to take medication without any prescription from health care professionals or any family, friend suggested to take medication. People pick a lot of information from internet to treat their own disease. Mostly a pharmacist suggests taking medication without any authentic order of health care professional (Syed et al., 2014). In the research mostly university going student used pharmaceutical product without consultation to any physician. Students who belong the degree of medicine like pharmacy and other medical profession like MBBS, BDS etc they take medication on their own behalf of their limited knowledge (Yasmin et al., 2022). Students goes to medical college or universities have knowledge about different disease and preferred their medication, so they take their medication on their own (Karmacharya et al., 2018).

Fever, cold, flu, body pain, cough, acidity, running nose, headache, diarrhea, nausea, vomiting, skin diseases and menstrual problems were some of the most common complains for which self-medication was done. Other include ear problems, allergies, chest

pain, eye disease, gastritis, myalgia, back pain, stomachache, bacterial and viral infections, tooth pain, sore throat, ulcer in mouth, sinusitis, abscess, and insomnia. OTC medications and dietary supplements are the substances that people self-medicate with the most frequency. In addition to analgesics, cold syrups, antibiotics, antimalarial are occasionally used as self-administration medications (Seam et al., 2018). Studies have indicated that the burden of self-medication with antibiotics is greater in poor nations compared to developed nations (Alam et al., 2015). The majority of students took NSAIDS, antibiotics, paracetamol, antihistamines, gastrointestinal medications, and herbal remedies for self-medication (Bukhari et al., 2022).

The most common types of medicine being used included Analgesics, Antipyretics, Antifungal, Antibiotics, Steroids, Antihistamines, Anti diarrheal, Anti emetics, Antacids, multivitamins. Paracetamol, ibuprofen, azithromycin, cetrizine, doxycycline, pantoprazole, metaclopramide, ORS, itraconazole, cefixime, levofloxacin, seconidazole, ofloxacin, diclofnac, tetracycline, co-amoxiclav were frequently used medicines. Other included anti ulcers, cough suppressants, anti-inflammatory, antispasmodic, lozenges, tonics, psychotropic drugs, decongestant, anti tissives, Ophthalmic prescriptions, sedatives, and tonics. Allopathic, homeopathic, homemade remedies, Ayurvedic, cosmetic products were also used by some. Some also used herbs for self-treatment. Throughout the 30 studies the sources of information/medicine for students were books, family, friends, internet, drug adds, prescription used by others with same illness, textbooks, pharmacy, seniors, old prescription, leftover medicines, pharmacist.

In some studies package inserts and consulting physician were the sources of information for self-medication. The reasons for self-medication were mildness of illness, lack of time to visit physician, seeking quick relief, cost effectiveness, ease and convenience, much information, prior experience, opinion from family members, emergency, long waiting time at clinics. Some took self-medication because of privacy reasons, enough pharmacological knowledge, physician advice wasn't effective, travelling problem, unfriendly government hospitals, exploitation by private hospitals. Some thought their problem wasn't important and some didn't trust their physicians.

AXIS tool

AXIS tool is the critical appraisal of Cross-sectional studies for the systematic evaluation of clinical research to examine trustworthiness, significance, and relevancy. The AXIS tool is a robust assessment instrument designed for evaluating the quality of interventional observational studies, encompassing cohort and case-control studies. Additionally, it serves to address the quality of study design and the potential for bias in cross-sectional studies. This tool is valuable for assessing the credibility, pertinence, and reliability of clinical research. As described in (Table 1 & 2).

Table 1 Appraisal tool for Cross-Sectional Studies (AXIS tool)

	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6	Study 7	Study 8	Study 9	Study 10	Study 11	Study 12	Study 13	Study 14	Study 15	Study 16	Study 17	Study 18	Study 19	Study 20	Study 21	Study 22	Study 23	Study 24	Study 25
Introduction																									
Clarity of Study Objectives	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Methods																									
Appropriateness of Study Design	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Justification of Sample Size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clarity of Population Definition	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Representativeness of Sample Frame	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Representativeness of Selection Process	✓	✓	✓	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓
Addressing Non-Responders	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Appropriateness of Risk Factor and Outcome Variables	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Validity of Measurement Instruments	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clarity of Statistical Significance Determination	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adequacy of Method Description	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Results																									
Adequacy of Basic Data Description	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Concerns Regarding Response Rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Description of Non-Responders	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Internal Consistency of Results	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Completeness of Results Presentation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Discussion																									
Justification of Discussion and Conclusions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Discussion of Study Limitations	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other																									
Potential Funding Sources and Conflicts of Interest	×	×	×	×	×	×	×	×	×	×	×	× `	×	×	×	×	×	×	×	×	✓	×	×	×	×
Ethical Approval and Participant Consent	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2 Study characteristics of the included studies

Sr #	Study	Study year	University Country	Study design	Sampling Technique	Sample size	Student category	Age	Gender	Complains for self-medication	Medicines being used	Source of information/ medicine	Reason for medication
01	Farah Yasmin, Muhammad Sohaib Asghar et al., (Yasmin et al., 2022)	January 25th to February 20th, 2021	Conducted online (Pakistan)	Cross-sectional study	Questionnaire	489	Students of Medicine and pharmacy	21.5 ± 3.5 years	Females = 381 Males = 108	1.Fatigue Sore throat Muscle pain/ body aches Anosmia Nasal congestion Fever Cough Breathing difficulty	Paracetamol Multivitamins Ibuprofen Antivirals Azithromycin Cetrizine Doxycycline Others	NG	COVID-19 prevention Used it without having any symptoms COVID-19 positivity Consumed regularly for other reasons COVID-19 symptoms
02	Ahsan Tameez-ud-din, Ifrah J. et al., (Malik et al., 2019)	January 2019 to June 2019	Rawalpindi Medical University (Pakistan)	Cross-sectional study	Semi-structured Questionnaire	349	Medical student	21.2 ± 1.9 years	Females = 245 Males = 104	Acne on back, face and chest	Allopathy Homeopathy Home-made remedies Ayurvedic medication Others	Acquaintances Books Prescription issued to others Drug ads Self-decision Others (Internet, seminars,	Mild illness Lack of time Old prescription Didn't wanted to involve faculty

											(cosmetic products, chemical peels)	lectures)	Embarrassment of discussing symptoms Pharmacological knowledge
03	MD Faiz Akram, Seema Manak et al., (Akram et al., 2018)	2014	Dental College and Hospital of Delhi (India)	Cross-sectional study	Semi-structured questionnaire	154	Dental Students	21.5 ± 2.5 years	Females = 97 Males = 57	Fever Vomiting Cough Bodyache Headache Stomach-ache Diarrhea Common cold	Paracetamol Antifungals Cetirizine Pantoprazole Ranitidine Ondansetron Metaclopromide ORS	Family Friends Books Chemist Internet More than one source	Minor illness
04	Chaitali Ashish Chindhalore, Ganesh Natthuji Dakhale et al., (Chindhalore et al., 2020)	June 20, 2019	A tertiary care teaching institute (India)	Cross-sectional, observational study	Semi-structured questionnaire	216	Students of MBBS, BDS, paramedical (occupational therapy/physiotherapy and BSc nursing)	20.23± 1.20 years	Females = 154 Males = 62	Headache Fever Muscular pain Dysmenorrhea Abdominal pain Toothache Cold and flu	Analgesics	Previous prescription Textbook Advertisement Other person	Quick relief Ease and convenience Time saving No need for consulting doctor Cost-effective
05	Nandita R, JothiPriya et al., (Devi & Assistant Professor, 2021)	2021	(India)	Cross-section	Questionnaire	100	Dental undergraduate students	NG	Females = 54 Males = 46	NG	Pain killer Antibiotics	Pharmacy	NG

06	Namita Kumari Mandal, Gajendra Prasad Rauniyar et al., (Mandal et al., 2020)	1st June 2018 to 30 August 2018	BP Koirala Institute of Health Sciences (BPKIHS), Dharan (Nepal)	Cross-sectionl	Semi-structured questionnaire	558	Students of MBBS, BDS	22.6 ± 1.8 years	Females = 133 Males = 152	Sore throat with runny nose fever tonsil infection skin wounds	Azithromycin Ofloxacin Cefalexin Mupirocine Ciprofloxacin Seconidazole Clindamycin Amoxicillin Levofloxacin Cefixime Itraconazole Cefadroxil	Retail Pharmacy Relatives family members Friends Seniors Medical representatives	Better asses to health-related information and facilities
07	Sana Khan, Rohina Ali et al., (Khan et al., 2018)	2018	Watim Dental College, Rawalpindi (Pakistan)	Coss-sectional a	Semi-structured questionnaire	30	Students of 1st and 2nd year, BDS	20.0 ± 3.0 years	Females = 21 Males = 9	Fever and headache Diarrhea Cough and common cold Nausea Constipation Skin problems Heartburn Dysmenorrhea Others (stress, fatigue, loss of appetite etc)	Analgesic Antibiotics NSAIDs Steroids Antacid Others	Family & Friends Pharmacist Media Old prescription Books Past experience	Late appointment Advertisement Unaffordable Doctor fee Internet Much information recommendation from family member or friend
08	Gul Mehar Javaid Bukhari et al., (Bukhari et al., 2022)	August to October 2020	Federal Medical College, Islamabad (Pakistan)	Descriptive cross-sectional	Simple random sampling	292	Students of MBBS	20.0 ± 2.0 years	Females = 187 Males= 105	Fever Insomnia Headache Dysmenorrhea body aches Mental stress Cough Constipation Diarrhoe Cold Acidity abdominal pain Acne allergies	Paracetamol GIT drugs Antihistamine Herbal medicines Antibiotics Psychotropic drugs other NSAIDs	Family members Friends own decision Media old prescription books	Quick relief Convenience time-saving prior experience

09	B Islam, MA Hossain (Islam and Hossain, 2019)	January 2019 to June 2019	Gazi Medical College, Khulna (Bangladesh)	Cross-sectional study	Semi structured questionnaire	113	Students of 4th year MBBS	21.5 ± 2.5 years	Females = 59 Males = 54	Runny nose headache Fever gastric acidity	Antibiotics Analgesics Antipyretics anti ulcerants	Old prescription of doctor Self decision Using medical textbooks Opinion of friends & family Advertisement on media Intro	Previous experiences Time saving minor illness Personal convenience seeking for quick relief
10	Aarti Bhandari, Rupali Upadhyay et al., (Bhandari et al., 2018)	2018	Pal College of Nursing and Medical Sciences (India)	Descriptive research	Purposive sampling technique	150	Nursing students	21.0 ± 3.0 years	Females = 139 Males = 11	Headache Cold Acne Fever Gastric problem Cough Allergic reaction Others	Analgesic Antibiotics Antispasmodic Antipyretic Others	Rom books Shop Internet Doctor By self	Previously prescribed
11	Kiron SS, Athira S R et al., (Kiron et al., 2018)	January to April 2018	Academy of Pharmaceutical Sciences, Pariyaram, Kannur (India)	Prospective, observational study	Questionnaire	399	pharmacy students	20.97 ± 1.482 years	Females = 349 Males = 50	Fever Body pain Cough Acidity Running nose Head ache Diarrhea Vomiting Skin disease Menstrual problem Hair fall	Analgesic Multivitamins Antimicrobial H2 blockers Antihistaminics Decongestant Anti emetics	Pharmacy shop friend or family	Previous doctor prescription Internet Own experience Class lectures Recommendation by community pharmacist Opinion from family members
12	Jyoti Prabha Bharati, Sanjay Ulak et al., (Bharati et al., 2021)	November 2020 to March 2021	Kathmandu Medical College (Nepal)	descriptive cross-sectional study	questionnaire	269	medical and nursing students	20.88 ± 1.51 year	Females = 269	Nausea Myalgia Vomiting Back pain Abdominal pain Diarrhea Headache Cramps	Mefenamic acid Diclofnac Ibuprofen Mefenamic acid +dicyclomine Paracetamol Other	NG	NG

13	Jyoti Tara Manandhar Shrestha, Dilip Kumar Kushwaha et al., Shrestha et al., 2021)	July 2020 to August 2020	Kathmandu University School of Medical Sciences, Dhulikhel (Nepal)	Descriptive cross-sectional study	Questionnaire	199	Medical and dental undergraduates	20.82 ± 1.75 year	Females = 113 Males = 86	Menstrual problem Headache Cough Fever Acidity Runny nose	Antihistaminics Antipyretics Antacids Analgesics Anti tissives	Pharmacies Friends Pharmacist's advice Family Pharmacology learning Leftovers medicines previous experience	Minor illness Instant relief previous exposure from disease knowledge from pharmacology teaching
14	Hina Khan, Jamil Ahmed Siddiqui et al., (Khan et al., 2020).	October 2019 to February 2020	Al-Tibri Medical College and Hospital (Pakistan)	Cross-sectional Study	Questionnaire	150	Students of 1st, 3rd, 5th year, MBBS	NG	Females = 62 Males = 88	Headache Vomiting flu/cough Stomachache Fever Diarrhea pain bacterial and viral infections	Sedatives Antipyretics Antacids Antidiarrheal Antibiotics Antiemetic's Antipyretics	NG	Emergency use Cost effectiveness Easily availability of Medicine Adequate Pharmacological knowledge Lake of time Minor illness Quick relief
15	Md. Omar Reza Seam, Rita Bhatta et al., (Seam et al., 2018)	January to June 2016	Dhaka University, Jahangirnagar University, Chittagong University, Comilla University, and Noakhali Science and Technology University (Bangladesh)	Cross-sectional	Questionnaire	250	Pharmacy student	21.5 ± 3.5 years	Female = 119 Males = 131	Headache Pain Cough Insomnia cold fever Skin rash Stomach ache Tooth ache Menstrual symptoms Eye infection	Analgesic Antiemetic Anti Diarrheal Antacids Cosmetic products Sedatives Vitamins Ophthalmics prescriptions	Friends Old prescription Internet Academic knowledge Advertisement	Minor illness Cost effectiveness Quick relief Emergency Lack of time Sufficient pharmacological knowledge

16	Harish G Bagewadi, Priyadarshini M Deodurg et al., (Bagewadi et al., 2018)	2018	Gulbarga Institute of Medical Sciences, Kalaburagi (India)	Cross-sectional	Questionnaire	134	Students of 2nd years, MBBS	± years	Females = Males =	Cough/cold Fever Pain Diarrhoea Nausea/vomiting Dismenorrhea	Herbal Vitamins Antipyretics Anti histaminic Antispasmodic Antimicrobials Analgesics	Friends Advertisement Internet Seniors Old prescriptions Textbook Pharmacist	Prior experience Emergency use Mildness of illness Lack of interest in medical services Long waiting time
17	Sara Shahid, Fahad Ahmad et al., (Shahid et al., 2023)	Jun, 2022 to August, 2022	(Pakistan)	Cross-sectional	Questionnaire	301	Students of MBBS, BDS, DPT and Pharm D	21.0 ± 0.5 years	Female = 164 Males = 137	Fever Cold Headache Cough Body pain GIT disorder Tooth pain Infection	Antibiotics Antidiarrheals Pain killers Antipyretics Cough syrup Topical agents Cold and flu preparations Nasal/ ear / eye drops	NG	NG
18	Anishma Karmacharya, Bipashwi Nath Uprety et al., (Karmacharya et al., 2018).	April to July 2016	Lumbini Medical College and Teaching Hospital (LMCTH) (Nepal)	Cross-sectional	Questionnaire	330	Students of 2nd, 4th, 6th, 8th smesters, MBBS	20.83 ± 1.7 years	Females = 142 Males = 188	NG	Vitamins and tonics Antipyretics Antimicrobials Ayurvedic medicines Painkillers Anti allergic Skin ointment	NG	NG
19	Archana Parihar, Diwanshu Sharma et al., (Parihar et al., 2018)	October to November 2016	Acharya Shri Chander College of Medical Sciences and Hospital, Jammu (India)	Cross-sectional	Questionnaire	200	Students of 1st, 2nd, 3rd semester, MBBS	20.5 ± 3.5 years	Females = 91 Males = 109	Abdominal pain Diarrhea Fever Cough cold, sore throat Dermal problems Vomiting Menstrual symptoms Headache	Antidiarrheals Ointment Lozenges Antiemetics Tonics Antihistaminics Antipyretics Antispasmodics Analgesics	Print media Class lecture Past exposure Internet Friends and relatives Television	Quick relief Previous experience Ease and convenience Learning opportunity Economical Avoidance of crowd Minor illness

20	Shivaraj Basavaraj Patil, Bhaskar Hebbani Nagaiah et al., (Patil et al., 2017)	October 2016	Kamineni Institute of Medical Sciences, Narketpally (India)	Cross-sectional	Questionnaire	129	Students of 2nd year MBBS	19.55 ± 0.62 years	Females = 87 Males = 42	Fever Hyperacidity Headache Sore throat Ulcer in mouth Cold and cough Vomiting Pain Diarrhea	Antiemetics Anti ulcers Antihistamines Cough suppressants Antipyretics Analgesics and anti inflammatory Antidiarrheals Multivitamins	Internet Pharmacist Friends and seniors Old prescription for sameillnesses Academic knowledge and books Advertisement Any other specify	Money saving Time saving Urgency Mild nature of illness Privacy Others
21	Devarajan Rathish, Buddhika Wijerathne et al., (Rathish et al., 2017)	March to July 2016	Rajarata University of Sri Lanka, Anuradhapura (Sri Lanka)	Cross-sectional	Questionnaire	696	Students of Medicine and Allied Sciences	23.2 ± 1.6 years	Females = 491 Males = 205	Runny nose Flu Diarrhea Acne Tonsil infection Sore throat Toothache Ear infection Sinusitis Abscess Oral ulcer	Amoxicillin Azithromycin Ciprofloxacin Cefalexin Tetracycline Co-amoxiclav	Retail pharmacy Relatives Household Friends	Previous experience No reach to physician care Poor economic condition No specific reason
22	Dr Divya Goel, Dr Sanjay Gupta (Goel, 2013).	2013	Nursing College of Haryana, (India)	Cross-Sectional	Questionnaire	119	Nursing Students	19.32 ± 0.82 years	Females = 95 Males = 24	Abdominal pain Cough Headache Fever	Paracetamol Antibiotics Cough suppressants Antihistaminics Analgesics Anti-ulcer drugs	Pharmacist Books Prior prescription Friends Prior illness Media	Cost-Effectiveness Ease Time-saving Learning Opportunity
23	Nithin Kumar, Tanuj Kanchan et al., (Kumar et al., 2013)	March to April 2011	Kasturba Medical College, Manglore (India)	Cross-Sectional	Semi-Structured Questionnaire	440	Medical Students	20.3 ± 1.5 years	Females = 250 Males = 190	Fever Vomiting Headache Diarrhea Cough /cold Ulcer in mouth Sore throat Insomnia Allergies	Antipyretics Antiemetics Anti tussives Tonics Analgesics Antidiarrhoel Antihistamines Sedatives Antibiotic	Fiends Pharmacist Old prescription Academic knowledge Drug advertisement Internet	Privacy Illness too mild for consultation Avoid crowd at Opd Sufficient Pharmacological knowledge For saving time

										s Antiulcer Vitamins Antispasmodic		
24	Abu Syed Md. Mosaddek, Md. Zakirul Islam et al., 2014	January, 2013 to January, 2014	Uttara Adhunik Medical College, Bangladesh Medical College, Medical college for Women and Hspital in Dhaka city (Bangladesh)	Cross-Sectional	Questionnaire	421	Students of 3rd and 4th year, MBBS	22.5 ± 2.5 years	Females = 254 Males = 167	Ear problems Fever with headache Allergy Constipation Diarrhea Fever with chills Cough and chest pain Eye disease Gastric pain	Antibiotics Ear drops Antiulcers agents Nasal decongestants Antidiarrhael Analgesics Cough syrup Laxatives Eye drops Vitamins Minerals Antipyretics Antiemetics Antihistamines	Self- decision relatives and friends media Herbalist's advice From reading material Others	Minor illness to play active role quick relief Avoidance of long waiting at clinics High cost Physician advice wasn't effective
25	Sheethal M P, Shanthi M et al., (Kumar et al., 2013)	June 2014	Adinchunchungiri college of Nursing in BG Nagar (India)	Cross-sectional	Questionnaire	112	Nursing students	20 ± 0.9 years	NG	Myalgia Fever Headache Gastritis Cough/cold	Antipyretics Cough syrup Analgesics Antibiotics Others	Fiends Pharmacist Previous prescription Traditional healers Reading material	Emergency Illness not serious Cost effective Prescribed for similar episode in past
26	P, Seenivasan; M G, Rajanandh et al., 16	January 2018	Sri Ramachandra Medical College and Research Institute (India)	Cross-sectional	Questionnaire	200	Health sciences students	NG	Females = 120 Males = 80	Cold Cough Flu	Analgesics Antipyretics	NG	Sufficient pharmacological Knowledge
27	Krishnandan shah, Shimul Halder et al., (shah et al., 2021)	2013	Tribhuwan University, Kathmandu University, Purbanchal University (Nepal)	Cross-sectional	Questionnaire	620	Medical student	23 ± 3.9 years	Female = 220 Males = 400	NG	Antiallergic Antiulcerants Antipyretics Antibiotics Analgesics Cough preparation	Self-decision Retailer/compounder ofpharmacy shops family member Old prescriptions	Unfriendly government hospitals Exploitation by private hospitals Time and expenditure Travelling problem

28	Rushi N Pandya , Kunal S jhaveri et al., (Pandya et al., 2013)	March 2010 to May 2010	Smt. NHL Municipal Medical college, Ahmedabad (India)	Cross-sectional	Questionnaire	747	Undergraduate medical students including interns	20.02 ± 0.069 years	Female = 217 Males = 468	Diarrhoea Fever Headache Bodyache Cough Abdominal pain Constipation	Paracetamol Antihistaminics NSAIDs GIT drugs Herbal medicines Anti-infective agents	Relatives Seniors Physicians Friends Textbook	Economical Time saving Quick relief Convenience Others
29	Naznin Alam, Nadia Saffoon et al., (Alam et al., 2015)	July 2014 to December 2014	Bangladesh	Cross-secttional	Questionnaire	500	Medical and pharmacy students	NG	Male = 200 Female = 300	NG	OTC drugs Slimming diet Herbal teas Homeopathic drugs Herbs Minerals Vitamins Mass gain remedies for muscles	NG	Mild illness Long waiting time My problems are not important No trust my physician to play active role regarding own health
30	F Susheela, Narayana Goruntla et al., (Susheela et al., 2018).	October 2016 to September 2017	Raghavendra Institute of Pharmaceutical Education and Research (RIPER), Balaji College of Pharmacy, Sri Krishnadevaraya University College of Pharmaceutical Sciences, and JNTUA-Oil Technological and Pharmaceutical Research Institute (India)	Cross-secttional	Questionnaire	403	Pharmacy students	20.5 ± 2 years	Females = 248 Males = 155	Body pains Fever Headach Gastritis cold and cough Diarrhea Vomiting menstrual cramps	Anacids Atihistamines ntibiotics cough suppressants NSAIDs antispasmodics	Pharmacist Books/ newspapers consulting physician Internet previous experience Package inserts previous prescriptions	To avoid crowd in hospital Time saving minor illness Economical emergency Quick relief

4. DISCUSSION

The present evaluation examined 30 studies in South Asia with 9070 people who self-medicated and the results show high prevalence of self-medication in these countries. A systemic review in Southeast Asia by Gaurav and Shekhar shows similar results (Nepal and Bhatta, 2018). Self-medication is far less common in developed nations like those in Europe, where over-the-counter sales are tightly controlled (Grigoryan et al., 2006). Various factors can contribute to cause such difference of self-medication prevalence among different regions of the world. Some of most vital factors may include illiteracy, poverty, cultural and religious believes. In the current analysis among the most frequent complaints that led to self-medication were fever, cold, flu, body pain, cough, acidity, running nose, headache, diarrhoea, nausea, vomiting, skin conditions, and menstrual issues. Similarly, the majority of study participants practiced self-medication when they had a cold or cough according to the study conducted by (Rashid et al., 2020).

Fever was the most common illness for self-medication in another study (Al-Flaiti et al., 2014). While in the study by Wegbom et al., (2021) people self-medicated prophylactically. The complaints for self-medication may vary according to the prevalence of diseases in different regions. A Cross-sectional study was conducted among 2nd year undergraduate medical students of Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka, in India to recognize the perceptions and practices in self-medication in which 134 students were shown adherence to self- medication. The cross-sectional study was found that 53% students adhere to self-medication was due to cough and fever.54% students shown practice toward self-medication.36% students was reported by using antibiotic and 25% students have a opinion that self-medication is a part of life (Bagewadi et al., 2018). A study was conducted among first-year medical students of the Arabian Gulf University, Bahrain in which some Saudi students were involved, recognized that self-medication practice was due to inadequate knowledge and drawback was adequate but, in most cases, it was common (Bagewadi et al., 2018).

A meta-analysis was conducted in 2014 which shows 4-92% prevalence rate among adults in Eurpeon and South American countries. In Romania, 44% university students were found to be practicing self-medication of antibiotic. 39% in Nigeria and 13% in Sri Lanka were also found to be self-medicated by antibiotic (Rathish et al., 2017). A Sri Lankan study was conducted in which 33.3% Urban population represent to be at higher in percentage as compared to Rural population 7.9%. Another study was conducted which found to be self- medicated by amoxicillin 97.5% due to upper respiratory tract infections (Rathish et al., 2017). According to recent Serbian study, 80% of medical students deeply indulged in practicing self-medication. Several studies have found to be reported that 88-95% medical students show adherence toward self-medication (Bukhari et al., 2022). A study was conducted in Karachi in which 52.1% students were self-medicated by antibiotic and 42.1% students have not positive attitude toward completion of antibiotic course (Bukhari et al., 2022).

Various studies have been conducted and shown that prevalence rate was higher in practicing physicians (Parihar et al., 2018). A common practice has been observed that practice toward self-medication in Nigeria shown to be high prevalence rate among health workers in which dental and nursing students are involved. A survey was conducted at All India Institute of Medical Sciences, the University of India was found that prevalence rate toward self-medication indulged to be at higher rate among undergraduate and paramedical students due to increase in medical knowledge (Kumar et al., 2013). A study has been conducted in India in which 76% medical students were more prone toward self-medication than uneducated people. Although many studies have been conducted throughout different population include medical students, nursing and Para- medical staff for the purpose to find out literacy rate. In nursing student, literacy rate was high.

To reduce the literacy rate among nursing students, knowledge toward self-medication should be increased because nursing student are major part of our society (Bhandari et al., 2018). Many researches have been conducted throughout the worldwide in practicing self-medication of antibiotic among medical students. Medical students have greater access about knowledge of antibiotic and shown greater response toward deliberate use of antibiotic (Mandal et al., 2020). According to WHO, COVID 19 was proclaimed to be a pandemic on January 30th, 2020.According to claim of WHO on 22nd October,2021,242 million cases have been reported in which 4.9 million was survived. According to small non randomized clinical trial, anti-malarial drugs include chloroquine and hydroxycholroquine was suggested to be evidence in treatment of COVID-19 prophylactically. Anti-malarial drugs was claimed to be banned during COVID-19 due to irrational use.

During third peak of COVID-19, emergency rate was higher and peak rate of self-medication was higher due to false knowledge, social media influene and easy availability of medicine in pharmacies. Herbal medicine includes Sanna makki which is used as laxative and also have negative impact of self-mediaction during the influence of COVID-19. The irrational use of antibiotic was also found to

be causing resistance during COVID-19 (Yasmin et al., 2022). Reason to take self-medication includes lack of interaction to the physician, availablityof OTC drugs in pharmacies without any prescription (anyone can purchase these), insufficient time to visit physician and being unable to get consultation. Brief ailment is also a reason of taking self-medication (Bagewadi et al., 2018). In Bangladesh price of self-medication is economical for people who are unable to bear expense by appointment of health care professional (Wegbom et al., 2021). Lack of transport facility is also a cause taking medication without consulting physician. Psychologically patient feel pleasant to take medication according to their previous knowledge (Yasmin et al., 2022).

The most common types of medicine being used included Analgesics, Antipyretics, Antifungal, Antibiotics, Steroids, Antihistamines, Anti diarrheal, Anti emetics, Antacids, multivitamins. Similarly, Analgesics, Antibiotics, Vitamins, Anti-allergic, Gastrointestinal drugs, Herbal remedies, Psychoactive were commonly used by population of a study conducted in Iran (Abdi et al., 2018). Paracetamol, ibuprofen, azithromycin, cetrizine, doxycycline, pantoprazole, metoclopramide, ORS, itraconazole, cefixime, levofloxacin, seconidazole, ofloxacin, diclofnac, tetracycline, co-amoxiclav were frequently used medicines by medical students in this review article. Whereas ciprofloxacin, cloxacillin, amoxicillin and co-trimoxazole were commonly used drugs by non-medical students according to a study of Ali Hassan Gillani (Gillani et al., 2017). The choice of drug selection for same indication may vary due to availability of the drug, trust or goodwill of different brands for same chemical molecules, difference in cost of similar molecules of different brands etc.

In this review common sources of information for self-medication by students were books, advice of family members, friends, internet, drug adds, prescription used by others with same illness, textbooks, and seniors. The student's self-medicated from previous prescription, leftover medicines or took the medicine form pharmacy. Similarly, according to a study of Brazil the practice of self medication was influenced, in the students' opinion, by friends and family, the usage of prior prescriptions, awareness of previously used medications, and media marketing (TV, radio, and internet) (Gama and Secoli, 2017). While in another study majority of individuals engaged in self-medication due to their familiarity with the drug and the information that the pharmacy's pharmacist had given them. Just a small percentage of SM practitioners acknowledged obtaining their information from outside sources (Rashid et al., 2020).

Similarly, according to a study of China the primary justifications given by the respondents for choosing self-medication were that the illness's severity did not warrant a visit to the doctor, that seeing a doctor would be too much trouble, that they did not have time, that the medication was based on prior experience, that friends or peers had recommended it, and that the costs were excessive (Lei et al., 2018). These explanations agree with the results of other research conducted in developing countries. The influence of the pharmacy owner in maximising revenue, consumer pressure, and lax regulatory frameworks have all been linked to the non-prescription sale of antibiotics in studies involving pharmacists in Saudi Arabia and Qatar (Bahnassi, 2016; Black et al., 2014). Therefore, it will take vigorous enforcement of regulations as well as community awareness initiatives to restrict the selling of drugs without a prescription. The healthcare system is already struggling with a lack of resources, and antibiotic resistance is expected to make matters worse financially.

This is particularly true since hospital stays for patients with resistant illnesses are usually longer and more costly second-line medications are required. South Asian Association for Regional Cooperation (SAARC), and the Ministries of Health of WHO SEAR member countries must develop targeted interventions that centre on these prevalent inappropriate medicine use practices. Therefore, by upholding and regulating laws and regulations pertaining to the dispensing of medicines in pharmacies and by raising public knowledge of adverse drug reactions, the emergence of superinfections, and antibiotic resistance, the situation in the WHO SEAR can be changed. Policymakers need to take the necessary steps to ensure that relevant policies are developed and implemented in order to address these issues. Following Measures were taken to avoid self-medication:

By teaching all local pharmacists how to treat mild illnesses and avoid non-prescription sales of prescription-only medications (Susheela et al., 2018)

Education training not only to public, pharmacist and pharmacy students (Susheela et al., 2018)

Another way is not providing OTC drugs to pharmacist (Bagewadi et al., 2018).

Not give permission pharmacy graduate to sell drug (Bagewadi et al., 2018).

Awareness about dosing schedule to avoid resistance (Malik et al., 2019).

They should not allow to prescribe medicine until they become a certified prescriber.

Give information about rational use of antibiotics by making part of their academic course (Mandal et al., 2020)

Update medical curriculum to give information about unethical aspect of self-medication (Khan et al., 2020)
Change the method of learning and change the concept of self- medication (Karmacharya et al., 2018)

5. CONCLUSION

South Asian countries have a high frequency of self-medication which is often linked to inappropriate drug usage. Thus, in order to assist we should develop measures targeted at lowering drug-related health risks among the undergraduate medical students. Relationships between various elements promoting self-medication should be comprehended and the evolving patterns should be evaluated. The problem of non-prescription usage may be lessened with the implementation of educational initiatives aimed at both the general public and healthcare professionals, as well as the enforcement of laws governing antibiotic non-prescription use.

Acknowlegment
We thank Department of Pharmacy Practice, Faculty of Pharmaceutical Science, Lahore University of Biological and Applied Sciences for their kind contribution and guidance in the preparation of this research work.

Limitations of the study
The current study is a systematic review of self-medication trends from the regions of South Asia. Therefore, it lacks the worldwide prospective of self-medication trends.

Authors' Contributions
This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Ethical Approval
The current systematic review was conducted after getting ethical approval from the university's ethical review board with ethical protocol number: ERB-PHRMD-DPP/4627-A

Informed consent
Not applicable

Funding
This study has not received any external funding.

Conflict of interest
The authors declare that there is no conflict of interests.

Data and materials availability
The data material utilized for this systemic review would be available on request.

REFERENCES

1. Abdi A, Faraji A, Dehghan F, Khatony A. Prevalence of self-medication practice among health sciences students in Kermanshah, Iran. BMC Pharmacol Toxicol 2018; 19:36. doi: 10.1186/s40360-018-0231-4
2. Akram MF, Manak S, Inder D, Alvi S. Self-medication practices and attitude among dental students of a Metro city of North India. Int Arch Biomed Clin Res 2018; 4:118-121.
3. Al-Flaiti M, Al-Badi K, Hakami WO, Khan SA. Evaluation of self-medication practices in acute diseases among university students in Oman. J Acute Dis 2014; 3(3):249-52. doi: 10.1016/S2221-6189(14)60056-1
4. Alam N, Saffoon N, Uddin R. Self-medication among medical and pharmacy students in Bangladesh. BMC Res Notes 2015; 8 :763. doi: 10.1186/s13104-015-1737-0

5. Bagewadi HG, Deodurg PM, Patil BV, Zahid SH. Perceptions and practices of self-medication among undergraduate medical students at Gulbarga Institute of Medical Sciences, Kalaburagi, India. Int J Basic Clin Pharmacol 2018; 7(1):63-7. doi: 10.18203/2319-2003.ijbcp20175676
6. Bahnassi A. Pharmacists views and practices in regard to sales of antibiotics without a prescription in Madinah, Saudi Arabia. J Patient Saf 2016; 12(3):159-164. doi: 10.1097/PTS.0000000000000087
7. Bennadi D. Self-medication: A current challenge. J Basic Clin Pharm 2013; 5(1):19-23. doi: 10.4103/0976-0105.128253
8. Bhandari A, Upadhyay R, Joshi A, Bajeta D, Maher D, Joshi J, Singh K, Bisht N, Misha N, Bisht R, Haldar P, Peter R, Bisht M. Self-medication practices in nursing students. IJSHR 2018; 3(2):35-39.
9. Bharati JP, Ulak S, Shrestha MV, Dixit SM, Acharya A, Bhattarai A. Self-medication in primary dysmenorrhea among medical and nursing undergraduate students of a tertiary care hospital: a descriptive cross-sectional study. JNMA J Nepal Med Assoc 2021; 59(238):537-541. doi: 10.31729/jnma.6397
10. Black E, Cartwright A, Bakharaiba S, Al-Mekaty E, Alsahan D. A qualitative study of pharmacists' perceptions of, and recommendations for improvement of antibiotic use in Qatar. Int J Clin Pharm 2014; 36(4):787-794. doi: 10.1007/s11096-014-9960-7.
11. Bukhari GM, Saleem HB, Maken ZH, Saleem S, Saleem T, Batool H. Frequency and causes of self-medication among the medical students of Federal Medical College, Islamabad, Pakistan. Rawal Med J 2022; 47(2):412-414.
12. Chindhalore CA, Dakhale GN, Giradkar AB. Comparison of self-medication practices with analgesics among undergraduate medical and paramedical students of a tertiary care teaching institute in Central India–A questionnaire-based study. J Educ Health Promot 2020; 9:309. doi: 10.4103/jehp.jehp_378_20
13. Gama AS, Secoli SR. Self-medication among nursing students in the state of Amazonas-Brazil. Rev Gaucha Enferm 2017; 38(1):e65111. doi: 10.1590/1983-1447.2017.01.65111
14. Gillani AH, Ji W, Hussain W, Imran A, Chang J, Yang C, Fang Y. Antibiotic Self-Medication among Non-Medical University Students in Punjab, Pakistan: A Cross-Sectional Survey. Int J Environ Res Public Health 2017; 14(10):1152. doi: 10.3390/ijerph14101152
15. Goel DD. Self-medication patterns among nursing students in North India. IOSR J Dent Med Sci 2013; 11(4):14-17. doi: 10.9790/0853-1141417
16. Grigoryan L, Haaijer-Ruskamp FM, Burgerhof JG, Mechtler R, Deschepper R, Tambic-Andrasevic A, Andrajati R, Monnet DL, Cunney R, Di-Matteo A, Edelstein H, Valinteliene R, Alkerwi A, Scicluna E, Grzesiowski P, Bara AC, Tesar T, Cizman M, Campos J, Lundborg CS, Birkin J. Self-medication with antimicrobial drugs in Europe. Emerg Infect Dis 2006; 12(3):452-9. doi: 10.3201/eid1203.050992
17. Inder D, Kumar P, Akram MF, Manak S. A comparative study for the evaluation of self-medication practices among dental students in a tertiary care dental teaching institute in Delhi. J Educ Ethics Dent 2018; 8(1):17-22. doi: 10.4103/jeed.jeed_14_18
18. Islam B, Hossain MA. Prevalence of self-medication practice among students of a medical college. Bang Med J Khulna 2019; 52(1-2):21-4. doi: 10.3329/bmjk.v52i1-2.46144
19. Karmacharya A, Uprety BN, Pathiyil RS, Gyawali S. Knowledge and Practice of Self-medication among Undergraduate Medical Students. J Lumbini Med Coll 2018; 6(1):21-26. doi: 10.22502/jlmc.v6i1.174
20. Khan H, Siddiqui J, Khan M. Self-Medication Among Undergraduate Students. J Bahria Univ Med Dent Coll 2020; 10(4):277-281. doi: 10.51985/jbumdc2020039
21. Khan S, Ali R, Orakzai GS, Khan RS, Hassan R. Self Medication Patterns among Undergraduate Dental Students. Int J Contemp Med Res 2018; 5(5):E1-E5. doi: 10.21276/ijcmr.2018.5.5.5
22. Kiron SS, Athira SR, Arya KS. The knowledge, attitude and practice of self-medication among pharmacy students. World J Pharma Res 2018; 7(16):736-45. doi: 10.20959/wjpr201816-13085
23. Kumar N, Kanchan T, Unnikrishnan B, Rekha T, Mithra P, Kulkarni V, Papanna MK, Holla R, Uppal S. Perceptions and practices of self-medication among medical students in coastal South India. PLoS One 2013; 8(8):e72247. doi: 10.1371/journal.pone.0072247
24. Lei X, Jiang H, Liu C, Ferrier A, Mugavin J. Self-medication practice and associated factors among residents in Wuhan, China. Int J Environ Res Public Health 2018; 15(1):68. doi: 10.3390/ijerph15010068
25. Malik IJ, Bhatti AA, Din AT, Sadiq A, Khan MT, Chaudhary NA, Arshad D. Assessment of Knowledge, Attitude, and Practices Regarding Self-medication for Acne Among Medical Students. Cureus 2019; 11(8):e5510. doi: 10.7759/cureus.5510
26. Mandal NK, Rauniyar GP, Rai DS, Panday DR, Kushwaha RP, Agrawal SK, Regmee P. Self-medication Practice of Antibiotics among Medical and Dental Undergraduate Students in a Medical College in Eastern Nepal: A Descriptive Cross-

sectional Study. JNMA J Nepal Med Assoc 2020; 58(225):328-332. doi: 10.31729/jnma.4914
27. Nandita R, Priya J, Devi G, Arivarasu L. Awareness of Self Medication Practices among Dental Undergraduate Students. Ann Rom Soc Cell Biol 2021; 25(2):2665-74.
28. Nepal G, Bhatta S. Self-medication with Antibiotics in WHO Southeast Asian Region: A Systematic Review. Cureus 2018; 10(4):e2428. doi: 10.7759/cureus.2428
29. Pandya RN, Jhaveri KS, Vyas FI, Patel VJ. Prevalence, pattern and perceptions of self-medication in medical students. Int J Basic Clin Pharmacol 2013; 2(3):275-80. doi: 10.5455/2319-2003.ijbcp20130608
30. Parihar A, Sharma D, Malhotra P. Questionnaire based assessment of knowledge attitude and practice of self-medication among medical undergraduates of a medical college in North India. JK Sci 2018; 20(2):67-72.
31. Patil SB, Nagaiah BH, Raikar SR, Rao V. Self-medication practices among 2nd year medical students in a rural medical college of Telangana state. Natl J Physiol Pharm Pharmacol 2017; 8(4):501–6. doi: 10.5455/njppp.2018.7.1040815112017
32. Rashid M, Chhabra M, Kashyap A, Undela K, Gudi SK. Prevalence and predictors of self-medication practices in India: a systematic literature review and meta-analysis. Curr Clin Pharmacol 2020; 15(2):90-101. doi: 10.2174/1574884714666191122103953
33. Rathish D, Wijerathne B, Bandara S, Piumanthi S, Senevirathna C, Jayasumana C, Siribaddana S. Pharmacology education and antibiotic self-medication among medical students: a cross-sectional study. BMC Res Notes 2017; 10(1):337. doi: 10.1186/s13104-017-2688-4
34. Seam MO, Bhatta R, Saha BL, Das A, Hossain MM, Uddin SN, Karmakar P, Choudhuri MS, Sattar MM. Assessing the Perceptions and Practice of Self-Medication among Bangladeshi Undergraduate Pharmacy Students. Pharmacy (Basel) 2018; 6(1):6. doi: 10.3390/pharmacy6010006
35. Shah K, Halder S, Haider SS. Assessment of knowledge, perception, and awareness about self-medication practices among university students in Nepal. Heliyon 2021; 7(1):e05976. doi: 10.1016/j.heliyon.2021.e05976
36. Shahid S, Ahmed F, Khan R, Bajwa A, Sana A, Ibtsam M, Iqbal MZ. Knowledge and attitude of self-medication among healthcare and non-healthcare students of lahore, pakistan. Univers J Pharm Res 2023; 7(6). doi: 10.22270/ujpr.v7i6.863
37. Shrestha JT, Kushwaha DK, Tiwari S. Study of self-medication among first and seventh semester medical and dental undergraduate students of tertiary care teaching hospital in nepal: a descriptive cross-sectional study. JNMA: J Nepal Med Assoc 2021; 59(233):55. doi: 10.31729/jnma.5385
38. Susheela F, Goruntla N, Bhupalam PK, Veerabhadrappa KV, Sahithi B, Ishrar SMG. Assessment of knowledge, attitude, and practice toward responsible self-medication among students of pharmacy colleges located in Anantapur district, Andhra Pradesh, India. J Educ Health Promot 2018; 7:96. doi: 10.4103/jehp.jehp_175_17
39. Syed MA, Islam Z, Rahman F, Akter S, Laizu J, Parvin R, Tabassum NE, Simbak NB, Haque M. A Pilot Study on Evaluation of Self-Medication among Undergraduate Medical Students in Dhaka, Bangladesh. Research J Pharm Tech 2014; 7(11):1240-1245.
40. Wegbom AI, Edet CK, Raimi O, Fagbamigbe AF, Kiri VA. Self-medication practices and associated factors in the prevention and/or treatment of COVID-19 virus: a population-based survey in Nigeria. Front Public Health 2021; 9:606801. doi: 10.3389/fpubh.2021.606801
41. Yasmin F, Asghar MS, Naeem U, Najeeb H, Nauman H, Ahsan MN, Khattak AK. Self-Medication Practices in Medical Students During the COVID-19 Pandemic: A Cross-Sectional Analysis. Front Public Health 2022; 10:803937. doi: 10.3389/fpubh.2022.803937