

**OVER THE COUNTER MEDICATIONS-A REVIEW**

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**ABSTRACT**

Health care professionals are one who has potential role in preventing risks of self-medication. Because he is the one who work on three main therapeutic aspects of professionalism in his daily practice: Information, therapeutic advice and education. Pharmacists play a valuable role in identifying, solving and preventing potential drug-related problems for the purpose of achieving optimal patient health outcomes and quality of life. Ambulatory based pharmacists have the opportunity and responsibility to foster safe, appropriate, effective and economical use of all medications, especially those therapies patients are self-selecting. Pharmacists should guide their customers to consult the physician before taking any medication by self. A community based cross-sectional study carried out at Sohiong area of Mawphlang Block, East Khasi Hills district, Meghalaya, India by research investigators on self-medication practices reflected that most common source of information for self-medication was family members and friends (38.7%). Local chemists were the second most common source of information (29.3%). Shuvashis Saha research investigator team conducted a cross-sectional study on evaluation of medicines dispensing pattern of private pharmacies in Rajshahi, Bangladesh on 75 randomly selected private pharmacies. The recommendation rate for antibiotics was highest for the quacks (26.48%) though the major amount of the antimicrobials (n = 3039, 65.83%) were dispensed on prescription. Anti-infectives were found to be the more dispensed medicines through over the counter compared to other class of medicines to customers who approached to community pharmacy. Macrolides, quinolones, metronidazoles and cephalosporins were most favourite drug of quacks. Interestingly pharmacists and clients did not ask for any carbapenems at all but quacks and doctors did.

**KEYWORDS:** Self, Medications, Pharmacists.**Self-Care**

Self-care is a lifelong habit and culture. It is the action individuals take for themselves and their families to stay healthy and take care of minor and long term conditions, based on their knowledge and the information available, and working in collaboration with health and social care professionals where necessary.

Self-care involves:

- Making healthy lifestyle choices such as physical activity and healthy eating, which allow the maintenance of good health and the prevention of illness.
- Making responsible use of all medicines (prescription and non-prescription).
- Self recognition of symptoms, which involves assessing and addressing symptoms, if necessary in partnership with a healthcare professional (not necessarily a doctor).
- Self-monitoring, which involves checking signs and symptoms for deterioration or improvement.
- Self-management, which includes being able to manage the symptoms of disease, either alone or in partnership with healthcare professionals or other people with the same health condition.

A country which fully encourages self-care can expect to have a healthier population and redeploy scarce resources in priority areas. Self-care can play a crucial role in the prevention of the coming global epidemic of non-communicable chronic diseases such as cardiovascular diseases, cancer and diabetes.

The benefits of self-care to society are empowered patients with higher self-esteem, improved wellness, longer life expectancy and reduced use of healthcare services.<sup>[12]</sup>

**Potential benefits for self care**

Individual level

- An active role in his or her own health care
- Self-reliance in preventing or relieving minor symptoms or conditions
- Education opportunities on specific health issues (i.e. stop smoking aids and products to treat heartburn)
- Convenience
- Economy, particularly since medical consultations will be reduced or avoided.<sup>[13]</sup>

**At community level**

- Good self-medication can also provide benefits such as:
- Saving scarce medical resources from being wasted on minor conditions
- Lowering the costs of community funded health care programs
- Reducing absenteeism from work due to minor symptoms
- Reduce the pressure on medical services where health care personnel are insufficient
- Increase the availability of health care to populations living in rural or remote areas.<sup>[13]</sup>

In a world of scarce government and in many countries scarce individual resources, responsible self-medication should be a cornerstone of healthcare provision and health policy.<sup>[14]</sup>

**Potential risks for self care**

- Individual level
- Incorrect self-diagnosis
- Failure to seek appropriate medical advice promptly
- Incorrect choice of therapy
- Failure to recognize special pharmacological risks
- Rare but severe adverse effects
- Failure to recognize or self-diagnosis contra indications, interactions, warnings and precautions
- Failure to recognize that the same active substance is already being taken under a different name
- Failure to report current self-medication to the prescribing physician (double medication/harmful interaction)
- Failure to recognize or report adverse drug reactions
- Incorrect route of administration
- Inadequate or excessive dosage
- Excessively prolonged use
- Risk of dependence and abuse
- Food and drug interaction
- Storage in incorrect conditions or beyond the recommended shelf life.<sup>[13]</sup>

**Community level**

- Improper self-medication could result in an increase in drug induced disease and in wasteful public expenditure.<sup>[13]</sup>
- Prevention of Potential Risks Associated with Self-medication.

**Role of health profession**

Health professionals are one who has potential role in preventing risks of self-medication. Because he is the one who work on three main therapeutic aspects of professionalism in his daily practice: Information, therapeutic advice and education.<sup>[14]</sup>

**Information**

Whenever health professionals are prescribing drugs, he should give proper instructions and explain for what it is

prescribed so that it will be helpful for the patient to understand and making his own decisions. Given information should be at patient's comprehension level so that it will be helpful for them to understand its management.<sup>[14]</sup>

**Therapeutic advice**

Lack of therapeutic compliance is a serious problem in both acute and chronic treatments and reflects a poorly-understood or incomplete description of the treatment aims. If patients are not well-informed they are unlikely to use medication correctly. However, if the directions for use and the limitations of a given drug are explained- for example, dose, frequency of dose, treatment course, how to take it, etc., then patients have a set of guidelines which will help them to use the drug correctly, both now and in the future. Inappropriate and erratic self-medication, along with lack of compliance, will only be reduced if patients are informed and understand clearly why certain advice has been given.<sup>[14]</sup>

**Education**

Inappropriate self-medication is the result of the medical model from which people have learnt. Proper health education should be given to the patients. By regularly adopting an educational attitude we can have an effect on large sectors of the population, on people who, in turn, may directly influence their friends and family. This aspect is of particular importance with respect to the self-medication of children by their parents or takes cares.<sup>[14]</sup>

**Role of pharmacist**

He is one of the key role players in educating his customers about the proper use of medicines, which are intended for self-medication. For that necessary steps have to be taken in his training and practice.

Pharmacists play a valuable role in identifying, solving and preventing drug-related problems for the purpose of achieving optimal patient outcomes and quality of life. Ambulatory based pharmacists have the opportunity and responsibility to foster safe, appropriate, effective and economical use of all medications, especially those therapies patients are self-selecting. Pharmacists should guide their customers to consult the physician before taking any medication by self.<sup>[13,15]</sup> unlike above role, pharmacists have following function as a:

**Communicator**

In order to address the condition of the patient appropriately the pharmacist must ask the patient key questions and pass on relevant information to him or her (e.g. How to take the medicines and how to deal with safety issues).<sup>[13]</sup>

**Quality drug supplier**

The pharmacist must ensure that the products he/she purchases are from reputable sources and of good quality.<sup>[13]</sup>

**Trainer and supervisor**

To achieve this pharmacist must develop a protocol for referral to the pharmacist, protocols for community health workers involved with the handling and distribution of medicines.<sup>[13]</sup>

**Collaborator**

It is imperative that pharmacists develop quality collaborative relationships with the other health care professionals, national professional associations, the pharmaceutical industry, governments (local/national), patients and general public.<sup>[14]</sup>

**Health promoter**

As a member of the health-care team, the pharmacist must participate in health screening to identify health problems and those at risk in the community, participate in health promotion campaigns to raise awareness of health issues and disease prevention, provide advice to individuals to help them make informed health choices.<sup>[14]</sup>

**Switch Climate**

India does not have a well-documented process or a specific regulation on switching Rx to OTC products and this is becoming need of the hour. Globally many countries have a formal process of transferring prescription (Rx) drugs to over-the-counter (OTC) status, known as "Rx-to-OTC switch. In these markets Rx to OTC switch is also seen as an efficient way of reducing healthcare costs by expanding the most inexpensive form of health care which is self-medication with OTC medicines. Regulators in India will sooner or latter need to very clearly define OTC formally as a category because at the end this will help promote access to market and will empower consumers who want to take a more active role in their own health care. In fact, in the near future, switching would be one of the most used strategies to enter OTC by new players.<sup>[16]</sup>

The reason why "switch" so far was not a big issue in OTC marketing is because currently even drugs which do not require a prescription are promoted via the doctor because:

- a) Marketing through medical representatives is less expensive than mass media advertised marketing. This makes that OTC medicines are higher priced than the equivalent medicines promoted ethically.
- b) Practically all Rx drugs can be purchased without a prescription.
- c) Doctor influence is strong in patient's purchase behavior.
- d) Distribution of allopathic OTC medicines is limited to drug licensed stores (mainly pharmacies).<sup>[16]</sup>

**US Switch Process**

In the USA, Rx and OTC products are regulated by two distinct methods. OTC products can be introduced into the US market without FDA pre-approval if the active ingredient, dose, formulation and indication fall within

pre-approved values, which are specified in an 'OTC monograph'. Rx products (or innovator OTC products), on the other hand require an NDA.

Rx products can be switched to OTC by the following means:

1. By the OTC drug review – this is initiated by the FDA commissioner.
2. By submission of an efficacy supplement to the existing NDA – This is the means for a sponsor to switch the Rx products in its entirety to OTC.
3. By submission of a new NDA – is is required for a sponsor to partially switch some of the indications to OTC, while retaining others within a prescription status.<sup>[17]</sup>

The entire process of switching the product can be summarized as follows:

- The sponsor contacts the office of non-prescription products (ONP) and requests a meet The initial meeting identifies all the issues sponsor will need to address
- The sponsor submits the switch application to the ONP
- ONP notifies the Specific Subject Matter Review Division (SSMRD) responsible for the therapeutic/pharmacological class
- The division of non-prescription evaluation (DNCE), which is part of the ONP responsible for review management and oversight of the NDA forms the review team with the SSMRD
- The SSMRD reviews the clinical efficacy and safety from clinical trials. e DNCE reviews the post-marketing data and consumer behavior studies as well as the non-prescription labeling.
- Meetings between review team and sponsor continue during review process
- The NDA review team identifies certain issues to be brought to the notice of an advisory committee. is non-prescription drug advisory committee (NDAC) is composed of individuals selected by the FDA Commissioner from among authorities knowledgeable in the fields of internal medicine, family practice, clinical toxicology, clinical pharmacology, pharmacy, dentistry, and related specialties.
- The sponsor and the FDA review team also provide brie ng documents and presentations to the NDAC. These are published on the FDA website
- The NDAC reviews and evaluates available data concerning the safety and effectiveness of the product for over-the-counter use and advises the Commissioner on the approval of the switch application for the drug.
- The directors of SSMRD and DNCE write a summary decisional review and come to a final consensus.<sup>[17]</sup>

### OTC Scenario in India

The OTC segment in India is not identified separately. Instead, anything that does not fall in the prescription drugs category is classified as being Over the Counter. The growth of the Indian OTC market has outpaced the other OTC markets in the world. Currently, the Indian OTC market ranks 11th in terms of market size globally. The Indian OTC market is extremely competitive at present. The pharmaceutical companies are fighting it out with the leading FMCG companies for a share of the consumer's wallet. Awareness is a major problem when dealing with OTC products in rural and semi-urban India and consumers prefer to self-medicate themselves using herbal options. In the extreme condition of a serious illness, a doctor is consulted.<sup>[18]</sup>

### Previous Studies

**A. Al-Mohamadi et al** conducted a study on dispensing medications without prescription at Saudi community pharmacies between December 2010 and January 2011 at retail pharmacies in Jeddah-KSA. A total of 60 pharmacies were randomly included in this study; 100% of the pharmacists working were male, 96.7% of them were non-Saudis and only 2 (3.3%) were Saudis. In a total of 119 drug requests, almost all pharmacists (97.9%) handed out the antibiotic immediately, 100% dispensed captopril and 89.5% gave the antipsychotic simply by following the collaborator's request without even asking for a doctor's prescription. In the second part of the study (where a mini-questionnaire is administered), 85% of the pharmacists agreed to answer the mini-questionnaire, and 15% refused to participate. The highest reason given for their wrongdoing, was for that if the pharmacist did not, others – of neighboring pharmacies – would do the same, followed by that there is no available OTC list.<sup>[19]</sup>

A community based cross-sectional study carried out at Sohiong area of Mawphlang Block, East Khasi Hills district, Meghalaya, India by **Apurba Marak et al** on self-medication practices. A total of 400 respondents, 150 respondents (37.5%) were male and 250 (62.5%) were female. Among them, 259 respondents (64.8%) were in the age group of 18–36 years while 127 respondents (31.7%) were in the age group of 36–55 years. 67 respondents (16.7%) were illiterate while 162 (40.5%) were educated up to middle schools level. Out of 400 respondents, 189 (47.3%) were of lower middle socioeconomic class and 92 (23%) were of upper lower socioeconomic class. Practice of self-medication was found to be slightly more among the males (54.7%) than the females (47.2%). High percentage of self-medication practices seen in the age group of 18–35 years. Among them, 55% had practices of self-medication. Self-medication practices were seen to be more among the respondents belonging to upper middle (71.1%) socioeconomic class. Medical emergency (22.5%), previous experience (15.5%), and economic reasons (5%) were the other reasons for self-medication practices observed in the study. Cough and common cold (28.3%)

were found to be the most common symptoms for self-medication. Fever, abdominal pain, and headache were the other common symptoms for self-medication. Our study found that most common source of information for self-medication was family members and friends (38.7%). Local chemists were the second most common source of information (29.3%).<sup>[20]</sup>

Descriptive cross sectional study was conducted by **Girma Belachew Gutema et al** on 307 health sciences students in ACMU from April to June 2011 on self-medication practices among health sciences students. Pre-tested and validated questionnaires were employed as tools for data collection. Study populations were determined by using two stages stratified random sampling methods. Among 148 reported illnesses prior to the study period, 94(63.50%) were males and 48(36.50%) were females with mean age of 21.5(18-25) years. The prevalence of self-medication in this study was 43.24% with most frequently reported symptom being headache 33(51.56%) followed by cough and common cold 28(44.80%). The two main reasons for self-medication were prior experience 25(39.10%) and mildness of the disease 24(37.50%). Paracetamol 31(48.44%) and NSAIDs 27(42.20%) were the two most frequently consumed medications with drug retail outlets 26(40.63%) as the main source of drugs to practice self-medication. Self-decisions 41(64.00%) followed by family/friends 20(31.65%) were the two most frequently reported source of drug information for self-medication in this study. More than half of the respondents disagreed with the practice of self-medication in the present study. Moreover, there were statistically significant differences between respondents who reported practicing self-medication based on gender, specific field of study and study year.<sup>[21]</sup>

**R Soumya** conducted a cross-sectional questionnaire-based study was undertaken from August 25, 2014, to September 25, 2014, including 200 pharmacies in various residential (R) and commercial (C) areas of Bengaluru on drug dispensing practices. Those who are dispensing without prescription at pharmacies was 45% of the total dispensing encounters, with analgesics (90%) being the most commonly dispensed drugs without prescription followed by antipyretics (68%), antihistaminics (49%), and antacids (46%). Dispensing without prescription was higher among pharmacies located in residential areas (46.64%) as compared to commercial areas (43.64%), which was statistically significant,  $\chi^2 = 15.2$ ,  $P < 0.001$ , and  $df = 1$ . Only about 19% of the pharmacists checked for all the particulars in the prescription before dispensing the drugs. Almost all of them (98%) maintained an inventory, computerized (41%), and manual (57%) while 2% did not. Although 97% (194) of the pharmacies had a refrigerator, 31% (66) of these did not have power back-up. Sixty-two percent (124) checked the pharmacy for drugs nearing expiry on a monthly basis. Only 50.5% were aware of Schedule H. About 60.5% did not know that prescription



in duplicate and stringent dispensing records have to be maintained while dispensing Schedule X and H1 drugs. Among who knew, 22% thought that they have to be maintained for Schedule X drugs only, 4.5% for Schedule H1 drugs only, and very few (13%) knew that these have to be maintained for both. The majority of them did not know about look alike sound alike (LASA) drugs and generic substitution (88% and 73.5%, respectively).<sup>[22]</sup>

A cross-sectional study was carried out in two towns of Tamilnadu, India between July 10 and October 25, 2009 by **Subal Chandra Basak et al** on evaluating medicines dispensing patterns at private community pharmacies. It was recorded that a total of 1160 medicines were dispensed during the study period. Medicine items were supplied to a total of 696 clients (222 with a prescription and 474 without a prescription). In all, 513 medicines (44.2%) were dispensed with a prescription from a physician and 647 (55.8%) were dispensed without a prescription. Out of the 647 items dispensed over the counter, 26.9% were dispensed on the request of clients themselves and 28.9% on the recommendation of a pharmacist or drug seller. Furthermore, there were 396 (61.2%) medicines which should have dispensed on a prescription only, however they were dispensed without prescriptions. The average number of medicines purchased without prescription per client was 1.36. The category with the highest number of medicines dispensed (on a prescription) was gastrointestinal medicines (n=112; 21.6%). Approximately 63% of the clients received medicines over the counter without a prescription. Anti-infectives were found to be highest number of medicines dispensed to the clients on request (n=86; 27.6%) and upon pharmacists' or drug sellers' recommendations (n=102; 30.4%). The majority of the anti-infectives (n=188; 78.7%) were dispensed over the counter. A total of 239 anti-infectives were dispensed accounting for 20.6% of all medicines. Of these 239 products, 36.0% were recommended by pharmacists, 42.7% were provided on request and only 21.3% were dispensed as prescription medicines.<sup>[23]</sup>

**Ashalatha Muppur et al** conducted a cross-sectional study on dispensing practices at pharmacy settings in Kadapa on 60 pharmacies. In these 60,40 pharmacies were independent while 20 pharmacies were attached to the clinics. Out of those which occur in independent pharmacies was 66%, while at pharmacies attached to the clinics was about 28% which was statistically significant ( $p>0.05$ ). Antipyretics (paracetamol) was the most commonly dispensed drug without prescription (62%), analgesics (60%), antihistaminics (40%), antibiotics (32%). 95% maintained an inventory and 80% of pharmacies were computerized. On voluntary base advise on dose frequency was 30%, on storage and instructions was 30%, on precautions and special instructions was 20% and on adverse effects was 10%. Advise on patient request regarding dose frequency was 60%, storage instructions were 45%, precautions and

special instructions was 35% and adverse effects was 5%. About 72% of the pharmacies had refrigerator, of these percentage in independent pharmacies was 45%, while in clinic attached pharmacies was 80%. Pharmacies with power back up were 60%, of these those in independent pharmacies was 45% and those in clinic attached pharmacies was 80%. 55% of pharmacists were aware of schedule H, of these the awareness was 54% in independent pharmacies and in those attached to the clinic was 72%. Percentage of pharmacists knowing about schedule X was 40%, of these in independent pharmacies was about 25% and those in clinic attached pharmacies was 35%. The majority of them were not aware of generic substitution (76%) and LASA (look alike and sound alike drugs, 85%).<sup>[24]</sup>

**Shuvashis Saha et al** conducted a cross-sectional study on evaluation of medicines dispensing pattern of private pharmacies in Rajshahi, Bangladesh on 75 randomly selected private pharmacies. A total 7944 clients visited the pharmacies under observation. Among this population 6313 clients bought 19,107 medicines (77.30%) with a prescription and 1631 clients purchased 5610 medicines (22.70%) without a prescription. About 894 prescriptions were given by quacks. Out of the 5610 items dispensed without prescription, 3714 items (66.2%) were dispensed on the request of clients themselves and 1896 items (33.8%) on the recommendation of a pharmacist or drug seller. Additionally, among 19,107 items which were dispensed with a prescription 2232 items (11.68%) were dispensed on the basis of prescription by quacks. More over 4131 (16.71%) prescription only medicines were sold without any prescription at all. A total of 24,717 medicines were dispensed by all pharmacies during the study period. The recommendation rate for antibiotics was highest for the quacks (26.48%) though the major amount of the antimicrobials (n=3039, 65.83%) were dispensed on prescription. Anti-infectives were found to be the most recommended medicines in all groups. Macrolides, quinolones, metronidazoles and cephalosporins are most favourite drug of quacks, clients and pharmacists. Interestingly pharmacists and clients did not ask for any carbapenems at all but quacks and doctors did.<sup>[6]</sup>

A cross sectional study was conducted by **Dima M. Qato et al** among persons aged 57 through 84 years from households across the United States to estimate the prevalence and patterns of medication use among older adults, and potential major drug-drug interactions between July 2005 and march 2006 by professional interviewers who conducted in-home interviews and compiled medication logs in English and Spanish. 4017 persons were eligible, of whom 3005 were successfully interviewed. During 2005 to 2006, 91% (95% CI, 90.0%–92.5%) of older adults, corresponding to 50.5 million adults aged 57 to 85 years, regularly used at least 1 medication. Prescription medication use was the most prevalent, used by 81% (95% CI, 79.4%–83.5%), or 44.9 million older adults. Nearly one-half of older adults

regularly used at least 1 over-the-counter medication or dietary supplement. The prevalence of prescription medication use was highest among the oldest age group. Women were more likely to use prescription medications (86.0%; 95% CI, 83.8%–88.2%) than men (76.6%; 95% CI, 73.1%–80.1%). The most commonly used prescription or over-the-counter medications were cardiovascular agents, such as aspirin, hydrochlorothiazide, atorvastatin, lisinopril, metoprolol, simvastatin, atenolol, amlodipine, furosemide, ezetimibe, valsartan, warfarin, and clopidogrel. Women reported more comorbid conditions compared with men aged 57 through 64 years. For example, 37% (95% CI, 33.6%–40.9%) of men reported no comorbid conditions compared with 25% (95% CI, 20.6%–29.6%) of women in this age group.<sup>[25]</sup>

A cross-sectional study was carried out by **Claudia Pileggi et al** at waiting rooms of 8 community based pediatrician (CBPs) in Catanzaro (Southern Italy), randomly selected from the list provided by the Local Health Units (LHU) including 37 CBPs that cover the healthcare needs of 56,520 pediatric patients from May 2013 through January 2014 all consecutive parents of ≤14 years old children attending CBP consultation to investigate over-the-counter drugs and complementary medications use among children in southern Italy. The overall response rate was 98.6% resulting in 728 participating parents. The vast majority of respondents were mothers (89.3%) and the average age was 36.3 years. Only 52.9% were employed. Mean age of children was 4.6 years; 15.9% had a chronic illness diagnosed by a physician and 11.3% regularly used at least one prescribed medicine; antihistamines (74.4%) and corticosteroids (11%) were the most commonly prescribed drugs used, especially for allergic symptoms. Positive attitude on nonprescription drugs (NPDs) use without the supervision of the CBP was reported by 74.4% of the respondents, whereas 61.5% of them had administered NPDs to their children in the last 6 months. Paracetamol was choice drug for fever (95%) or headache (49%). Probiotic strains (e.g., lactobacilli spp.) were the most common products for gastrointestinal disorders (61%). For dermatological symptoms parents chose corticosteroid based drugs (22%) and complementary alternative medicines (CAMs) (e.g., calendula, *Apis mellifica*) (14%).<sup>[26]</sup>

A cross-sectional study conducted by **Andréa Dâmaso Bertoldi et al** to estimate the point prevalence of self-medication among adolescents aged 18 years and to evaluate the type of drugs used (either over-the-counter or prescription drugs) and socioeconomic, health-related, and behavioral correlates of self-medication using the 1993 Pelotas (Brazil) Birth Cohort Study. Data were obtained through the administration of a questionnaire to adolescents aged 18 years. 5,249 agreed to participate in this study. Subsamples of these children were followed up at ages 1, 3, and 6 months and 1, 3, 6, and 9 years. A total of 4,106 adolescents were interviewed. The sample

comprised almost the same proportion of males (n 1/4 2,015) and females (n 1/4 2,091). The point prevalence of medicine use was 41.1% (95% confidence interval [CI] 39.6e42.6), and the proportion of self-medication among medicine users was 65.1% (95% CI 62.8e67.4). The point prevalence of self-medication was 26.7% (95% CI 25.4e28.1), and it was higher among female adolescents, those more educated, and those who rated their health as poor. Out of the drugs used (58% of all drugs used), 1,003 (78.7%) were nonprescription drugs and 271 (21.3%) were prescription drugs. The most frequently used drugs were analgesics (56.1%), systemic antihistamines (7.4%), and anti-inflammatory and anti-rheumatic products (7.1%). The main reasons reported for medicine use were headache (30.9%), pain (17.1%), contraception (8.8%), infection (6.8%), cold/ flu (6.3%), allergies (3.7%), abdominal pain (3.1%), gastric disorders (2.6%), anxiety (2.2%), anemia (1.8%), asthma (1.7%), depression (1.3%), seizures (1.2%), and inflammation (1.1%).<sup>[4]</sup>

A **Ahmad et al** conducted a cross-sectional study carried out at community pharmacies in a rural town Sahaswan, Uttar Pradesh, over a period of 42 days. The data was collected by conducting the interview with patients when they exited from the pharmacy. Out of the 20 pharmacies, 6 pharmacies were selected on the basis of stock maintenance, reputation, accessibility and sales turn over. Out of 1600 subjects, 800 came to purchase medicines without prescription and out of those 800, 600 agreed to participate in the study. Among the respondents, 66% (396/600) of the participants were males and 34% (204/600) were females. Majority of the respondents belonged to the age group of 36-60 years (50% [300/600]). 22% (131/600) subjects had chronic diseases. 50% (300/600) of the study population were taking self-medication rarely, 33% (200/600) self-medicated occasionally. Some of the primary reasons for practicing self-medication were high treatment costs in hospitals (40% [240/600]), simple nature of the disease (15% [90/600]. Source of information, family, friends and neighbors [33% (198/600)], sought information from media (25% [150/600]) or from a pharmacist (22% [132/600]) respectively. Most commonly used medications for self-medication: Non-steroidal anti-inflammatory drugs (NSAIDs) (25.3% [152/600]) antihistamines (19.7% [115/600]) with the most common being cetirizine (10%)[60/600] and pheniramine maleate (8% [48/600]), gastrointestinal drugs (20.8%)[125/600] with the most common being ranitidine (9.2% [55/600]) and antibiotics (16.7% [100/600]) with the most common being tetra cyclines (8.2% [49/600]).<sup>[27]</sup>

**Umar M Lawan et al** conducted a descriptive, cross-sectional study design among adult residents of Kano metropolis. Three hundred (78.9%) out of the 380 subjects studied admitted using drug (s) in the past without the prescription of a physician. About a quarter (26.3%) reported using the drugs on their wards. More than half (54.8%) had used drugs occasionally, while

12.1% had been very frequent with them. The respondents reported consumption of one or more drugs without obtaining a prescription. The drugs commonly consumed were antimalarials (42.1%), analgesics (40.6%), and antibiotics (29.4%). Cough mixtures/antitussives were also used by 13.3% of the respondents. Similarly, 5.9% of drugs like vitamins, laxatives and oral contraceptive pills were consumed without the prescription of a doctor or other relevant health workers. Majority of these respondents obtained the drug (s) from either the patent medicine stores (62.5%) in town, or from drug stores in the market (19.8%). The drug vendors (41.5%) and family/friends (26.6%) provided the respondents with instructions on how to use the drugs consume. In 25.1% of cases however, respondents needed no external instruction on the use of the drugs commonly consumed. About two-thirds 247 (65.0%) of the respondents correctly perceived that self medication could be hazardous; and about half (51.58%) were aware of at least one hazard of self medication when prompted using unstructured question. Common hazards identified include drug resistance/drug failure (65.26%), addiction (52.37%) and poisoning (43.42%).<sup>[28]</sup>

**Andrea Nicolas et al** conducted a study in German to quantify DRPs in prescribed medicines identified by community pharmacists (CPs) at the time the medicine is dispensed. Invited CPs to document one hundred consecutive patients presenting prescriptions using a standardized documentation form. For each patient, person- and medication-related as well as identified DRP-related data were documented. Data were transcribed electronically, coded if necessary, checked for validity, and analyzed. Main outcome measure Nature and frequency of DRPs. 143 CPs documented 14,231 patients with 24,422 prescribed drugs and identified DRPs in 2,556 patients (18.0 %). Analyses resulted in 0.23 DRPs per patient and 0.13 DRPs per prescribed medicine. Four DRPs were responsible for almost 70 % of all DRPs: Potential drug–drug interaction (22.9 %), dose not known to patient (21.7 %), patient insecure due to generic substitution (13.5 %), and insufficient patient knowledge of correct drug use (10.9 %). If a patient's drug file was kept in the pharmacy, specific types of DRPs were detected more frequently e.g., drug–drug interactions ( $p < 0.001$ ). Interventions primarily comprised counselling, monitoring, and changing drug or instructions for use. The prescribing physician was contacted in 28 % of DRPs resulting in a change of these prescriptions in 50 % of the cases. Overall and according to the pharmacists, more than 90 % of the DRPs detected were partially (10.4 %) or completely (85.4 %) solved.<sup>[29]</sup>

**Shyam Sunder Keshari et al** conducted a cross-sectional study carried out in rural area of Barabanki to assess the knowledge, awareness and perception of self-medication practices by house-to-house survey during the period of October 2013 to March 2014. Out of 235 participants enrolled, 168 responded (71.5%). A total of

67 (28.5%) participants were excluded in accordance with the exclusion criteria like incomplete information and not using self-medication. Out of 168 respondents, 117 (69.6%) reported self-medication within 1 year of recall period. The prevalence of self-medication in the study population was more common in males (81%) as compared to females (19%) and it was more common in persons with 31-45 years of age (44.0%). Self-medication was more common in illiterate population (38.7%). Most common conditions/symptoms for self-medication were fever (72.6%), pain (64.3%) and respiratory symptoms (57.1%), followed by infections, headache and diarrhea, etc. The most commonly used drugs for self-medication were paracetamol (56.5%), drugs for gastrointestinal problems (40.5%), nonsteroidal anti-inflammatory drugs (NSAIDs) (39.9%) followed by cold remedies, antimicrobials, etc. The important sources of information for self-medication were previous prescription of doctors (72.6%), friends and neighbors (52.4%) and chemists (38.1%). In present study, most common reasons for favoring self-medication were time saving (45.2%) followed by high cost of consultation (42.3%), minor illness (39.9%) followed by convenience (25.0%).<sup>[30]</sup>

**Mohamed Azmi Hassali et al** conducted a cross-sectional survey using a convenience sampling method. The study was conducted in Kuala Lumpur, the capital of Malaysia. All 384 adults responded to this study and 314 (81.7%) participants were included in the final analysis. The majority of participants were male 170 (54.1%), and 36.9% of patients were between the ages of 30 and 39. Most were Chinese (144, 48.9%), and married (181, 57.6%). 123 (39.2%) were degree holders and 149 (47.5%) worked in the private sector and 84 (26.8%) earned more than RM4000 (\*1,150 USD). Out of the final sample, 197 (62.7%) stated that they had taken at least one medication in the previous week at their own discretion without prescription. Those above 60 years of age (13, 100%) and 36 (85.7%) participants between 50 and 59 years old were found to self-medicate. 163 (51.9%) were taking at least one medicine daily, 143 (45.5%) were taking vitamins and 87 (27.7%) consumed traditional supplements. In addition to that, 121 (38.5%) participants were suffering from a medical condition that required regular medication. Most participants obtained medication from either pharmacies ( $n = 162$ , 51.6%) or clinics ( $n = 89$ , 28.3%). The most common therapeutic groups of self-medicated drugs were cough and cold preparations ( $n = 210$ , 66.9%) followed by pain medication ( $n = 183$ , 57.6%), diarrhea ( $n = 138$ , 43.9%), allergy and/or rashes ( $n = 111$ , 35.4%), constipation ( $n = 105$ , 33.4%), weight loss ( $n = 84$ , 26.8%) and heartburn ( $n = 79$ , 25.2%). In this survey, 218 participants (69.4%) would consult healthcare professionals before purchasing any medication whereas 106 (33.8%) would refer to a friend or family member. Only 29 (9.2%) sourced information from the internet and 22 (7.0%) relied on advertisements. It was found that 273 (86.9%) would consult a pharmacist before buying any medication and



197 (62.7%) of the total participants believed that over-the-counter medicines are as effective as those prescribed by the doctor.<sup>[31]</sup>

A cross-sectional study was conducted by **Luca Garofalo et al** to document the prevalence, the determinants, and the reasons of oral medication use without the prescription of a physician among a random sample of 672 parents of students attending randomly selected public schools in Italy. Out of 989 randomly selected people, in total, 672 participated for a response rate of 67.9%. Approximately two-thirds were females and one-third were unemployed, and three-quarters reported a personal history of chronic disease. Of the 672 participants, 465 (69.2%) stated that they had used an oral medication without the prescription of a physician at least once in their lives. Among participants reporting an experience of oral self-medication, 334 (71.8%) reported having done so at least once in the 12-month period preceding the study. The analysis of the drugs/drug groups used for oral self-medication by the 334 respondents in the 12-month period preceding the study showed that a total of 560 episodes were reported and the nonsteroidal anti-inflammatory drugs (NSAIDs) (83.5%) were most commonly used, whereas less frequently antibiotics (26.7%), antacids (4.2%), and corticosteroids (3.4%) have been used. Participants engaged in self-medication most frequently because they felt that the illness was too mild and they did not require the services of a doctor (84.1%); other reasons were that they used an old prescribed medication (32.9%) and that they were prompted by a pharmacist (29%).<sup>[32]</sup>

**Neha Loharkar et al** conducted a cross-sectional study to analyze the self medication use in Pune city and also assesses the rationality of self medication. With the help of semi-structured questionnaire data was collected by II MBBS students for this study. Information about the names of the self medications, diagnosis for the use of self medication, source of information for self medication use and adverse effects reported to self medications was collected. The drugs that are commonly self medicated in Pune city were: analgesics (28.68%), antibiotics (13.18%), vitamins (10.85%) and GIT ailment drugs (14.34). Apart from this, herbal drugs and skin problem drugs are predominantly self medicated in Pune city. Information about the self medication was predominantly obtained from previous prescription of doctors (62.41%) and from chemists (18.99%) and advertisement was the 3rd important source of self medication in Pune city (9.69%). Antibiotics self medication use was associated 29.41 % ADRs. The adverse effects reported with antibiotic self medications were: vomiting, hyperacidity, diarrhea, headache, confusion. 27.03 % adverse effects reported with NSAIDs self medication use.<sup>[33]</sup>

A cross-sectional survey was conducted by **Amy R Sapkota et al** in February 2008 at four universities located in Southwest Nigeria to assess Self-medication

with antibiotics for the treatment of menstrual symptoms. The survey was self-administered and included questions pertaining to menstrual symptoms, analgesic and antibiotic use patterns, and demographics. A total of 706 out of 740 administered surveys (95.4% response rate) were completed and returned by female students attending Babcock University, Covenant University, University of Ibadan, and Obafemi Awolowo University. The majority of study participants (88%: 95% CI, 86% to 91%) reported experiencing three or four menstrual periods during the three-month time period that served as the focus for this study. Eighty-six percent (95% CI: 83% to 88%) of participants reported experiencing pain or discomfort associated with their menstrual periods during this time frame. When asked about the self-medicated use of analgesics and other pain-relieving medications, such as aspirin and ibuprofen, 39% (95% CI: 36% to 43%) of respondents reported that they had used these types of medications to treat menstrual symptoms in the past three months. The usage prevalence for these drugs was as follows: aspirin, 2% (95% CI: 1% to 3%); Panadol (paracetamol), 29% (95% CI: 26% to 33%); Panadol Extra (paracetamol and caffeine), 7% (95% CI: 5% to 9%); ibuprofen, 9% (95% CI: 7% to 12%); buscopan (butylscopolamine), 10% (95% CI: 8% to 12%); Feldene (piroxicam), 11% (95% CI: 8% to 13%); and other drugs, 11% (95% CI: 8% to 13%). Largest proportions indicated that antibiotics relieved backache, joint or muscle pain (10%, 95% CI: 8% to 12%), headaches (10%, 95% CI: 8% to 12%), and cramps (9%, 95% CI: 6% to 11%). Doctors or nurses (6%, 95% CI: 4-7%), friends (6%, 95% CI: 4-7%) and family members (7%, 95% CI: 5-8%) were most likely to recommend the use of antibiotics for menstrual symptoms, while these drugs were most often obtained from local chemists or pharmacists (10.2%, 95% CI: 8-12%).<sup>[34]</sup>

A cross-sectional questionnaire based study was conducted by **PR Shankar et al** in Pokhara valley in Western Nepal. Aim of the study was to obtain baseline data on self and non-doctor prescribing, factors influencing self-medication and non-doctor prescribing and association of self-medication and non-doctor prescribing with demographic factors. The study was carried out for 6 months duration of time. Total 142 respondents were identified and administered a semi-structured questionnaire. Demographic information and information on drugs used for self-medication or prescribed by a non-allopathic doctor were collected. 76 respondents (54%) were aged between 20 to 39 years. The majority of the respondents (72%) stayed within 30 minutes walking distance of a health post/medical store. Among the respondents 59% had taken some form of self-medication in the 6 months period preceding the study. The common reasons given for self-medication were mild illness, previous experience of treating a similar illness and non-availability of health personnel. Among the respondents 70 % were prescribed allopathic drugs by a non-allopathic doctor. The compounder and



health assistant were the common sources of medicines. Paracetamol and antimicrobial drugs were most commonly prescribed. A significantly higher proportion of young male respondents (<40) had used self-medication than other groups. The conclusions drawn out of the study were that self-medication and non-doctor prescribing were common in the Pokhara valley. In addition to allopathic drugs herbal remedies were also commonly used for self-medication.<sup>[35]</sup>

A cross sectional study was conducted by **Marwa Al Flaiti** in October 2013-January 2014 to evaluate the practice of university students towards self-medication to treat minor ailments. A total of 450 university students were randomly selected and their verbal consent was obtained. The data were collected through the self-administered, close-ended, pre-tested questionnaire and was analyzed statistically by SPSS version 19.0. Overall 204 males (45.3%) and 246 females (56.7%) participated in the study. The mean age of respondents was 22.3 years. Ninety-four percent of respondents reported practicing self-medication and 165 (36.7%) participants admitted of having purchased drugs without prescription more than four times over the last six months. Headache, fever, cough and cold were the most common ailments which prompted respondents to seek self-medication. Analgesics, cough preparations and antibiotics were the most common classes of drugs used in self-medication. The majority of respondents practiced self-medication either because their illness was not serious or they had prior experience with the drug. The majority of respondents had good medication knowledge which they reported to have acquired from reading drug leaflet or from the pharmacist's advice. The study concluded that the prevalence of self-medication among university students was very high. There is a need for intensive education and comprehensive awareness campaign to advocate for reduction in the prevalence of self-medication practices among students.<sup>[36]</sup>

**Mai Duong et al** conducted a study by the use of The Echantillon Généraliste de Bénéficiaires database, a permanent representative 1/97 sample of SNIIR-AM, the full population database of the persons covered by the French National Health Insurance Systems for salaried workers (75% of the French population in 2010) to identify usage patterns, concomitant chronic diseases and cardiovascular medication in OTC and POM NSAID users. The study cohort included all patients in EGB aged  $\geq 15$  years with at least one dispensation of any oral NSAID between 1 January 2009 and 31 December 2010 (43.6% of the total database population of 526108). Of these, 44 484 (19.4%) patients used only OTC NSAIDs, 121 208 (52.8%) used only POM NSAIDs, and 63785 patients (27.8%) were dispensed both OTC and POM NSAIDs. There were six OTC NSAIDs, namely ibuprofen, diclofenac, ketoprofen, naproxen, fenoprofen and mefenamic acid, and 20 POM NSAIDs. Four NSAIDs (ibuprofen, ketoprofen, diclofenac and naproxen) were available as both OTC and POM

preparations. Other NSAIDs had either only OTC preparations (1924 patients, 4.3% of exclusive OTC NSAIDs users) or only POM preparations (78 423 patients, 64.7% of exclusive POM NSAIDs users). The OTC users were younger than POM users (39.9 vs. 47.4 years old) and more often female (56.7 vs. 53.0%). Those who used both OTC and POM NSAIDs were on average 41 years old and 62.7% female. The OTC users had fewer prevalent ALD than POM users (18.9 vs. 27.6%) and fewer cardiovascular ALD. Severe arterial hypertension was the most common of the cardiovascular ALD present at inclusion, reported in 1.4% OTC vs. 2.5% POM users. There were <1% of any individual incident cardiovascular ALD over the 2 years of observation. During follow-up, 23.7% of OTC users had at least one dispensation of a cardiovascular drug, vs. 36.7% of POM users; these were mostly  $\beta$ -blockers, agents acting on the renin-angiotensin system and lipid-lowering agents. A mean of 14.6 defined daily doses (DDD) were dispensed over 2 years for OTC vs. 53 for POM; 93% OTC vs. 60% POM patients bought  $\leq 30$  DDD over 2 years, and 1.5 vs. 12% bought  $\geq 90$  DDD. Chronic comorbidities were found in 19% of OTC users vs. 28% of POM users; 24 vs. 37% had at least one dispensation of a cardiovascular drug over the 2 years.<sup>[37]</sup>

**Regina Dengler and Heather Roberts** conducted a school-based survey using a self-completion questionnaire on the use of prescribed drugs and over-the-counter preparations on adolescence. Schools were randomly selected within each of the ten Health Districts. A total of 85 schools took part, being 94 per cent of the schools agreeing to participate. Between February and June 1994, whole year groups (Year 7 aged 11-12 years, and Year 10 aged 14-15 years). Girls aged 14-15 years are more likely than others to have used at least one of the drugs in the previous week, with 40 per cent of girls in this age group having used a non-prescribed painkiller. Young people who took a prescribed drug, an OTC painkiller or a cough or cold medicine are also more likely to have taken another drug. This effect is marked for non-prescribed painkillers. The most important association with the use of prescribed drugs is the presence or absence of a long-term illness, health problem or disability. The odds of using a prescribed drug are 4 to 1 for young people with a long-term illness compared with others. For older girls the odds are 5 to 1. For someone who has had two or more injuries in the previous six months compared with someone with no injuries in this time period, the odds are 1-3 to 1 that they have used a prescribed drug, more than 2 to 1 for older girls, whereas one injury does not make a difference. Use of OTC cough or cold medicines is associated with injuries for older girls, with the odds being 1-3 to 1 for girls aged 14-15 with one injury only compared with no injury. For those with two or more injuries compared with someone with no injury, the odds increase to 1-6 to 1. There is no association with emotional feelings or social support.<sup>[38]</sup>

A cross-sectional observational study using a pre-piloted questionnaire was conducted by **Al-Motassem M. Yousef et al** on Self-Medication Patterns in Amman, Jordan between December 2003 and April 2004. The total number of pharmacy stores that participated in the study was 155 out of 200 (77.5%), and 819 out of 1326 patients approached (61.8%) agreed to participate in the study. Men accounted for 54% of the total sample. The average age was 35 ( $\pm 16.7$ ) years, with the majority ( $n = 620$ , 76%) of the sample was between 20 and 59-years old. There was no significant age difference between men ( $36 \pm 16.9$  years) and women ( $34 \pm 16.3$  years) ( $P = 0.24$ ). Men within the studied sample had slightly higher levels of graduate education than women (men: ( $n = 257$ , 58%) versus women: ( $n = 176$ , 47%),  $P = 0.01$ ). Almost two thirds ( $n = 167$ , 70%) of the respondents reported an income less than 400 Jordanian Dinars (JD) (\$571) per month. Gender, age, education level, family size, and monthly income of the sample were representative to that of Amman's population. Self-medication was a common practice among Jordanians (42.5%). The most common reasons for self-medication were that the ailments were too minor to see a doctor (46.4%), the long waiting time to be seen by doctors (37.7%) and avoiding the cost of doctors' visits (31.4%). People tended to select medication based on advice received from pharmacy staff (14.2%), friends/ neighbors (17.6%) or informal advice from other health professionals like dentists and nurses (21.9%). Alternatively, patients selected products based on their previous experiences with similar symptoms (27%) or similar dis- eases (33.5%).<sup>[39]</sup>

A questionnaire based study was conducted by **Nalini GK** to evaluate the self- medication of self-prescribed antibiotics among Government doctors in the Hassan district of Karnataka, India. A close and open-ended questionnaire was used to collect data from a sample of 160 Government doctors randomly chosen from the Hassan district. Data were collected using a self-assessing questionnaire. Data were entered and analyzed using SPSS 14 and the results were presented as a percentage. Out of the 160 doctors only 97.5% filled and returned the questionnaires. Self-medication with antibiotics was reported by 53% of doctors during the cross-sectional study. The main indication for self-medication with antibiotics was respiratory problems (73.3%) such as common cold and sore throats. Amoxicillin was the most commonly used antibiotic (40%). The main source of medicines was from medical representatives (47.8%, samples), drug stores (44.8%, self-prescribed) and the Government hospital pharmacy (7.4%). Only 26.8% antibiotic users completed their course. The study concluded that the prevalence of self-medication with antibiotics is high among doctors. Hence educational programs are needed to improve potential problems of self-medication with antibiotics and to minimize the different forms of prescribing errors, by vigorous training programs.<sup>[40]</sup>

A cross-sectional descriptive study was conducted by **Badiger S et al at the K.S.Hedge** Medical Academy, Mangalore to determine the reasons for and pattern of self- medication. Medical students from first to final year were selected through convenience sampling. The data were collected using a pre-tested semi-structured questionnaire. The data were analyzed using SPSS version 16 and the results expressed as proportions. A total of 200 students, 121(60.5%) female and 79 (39.5%) male, were included in the study. Of the medical students surveyed self-medication was reported among 92%. The most common ailments for which self-medication were used include common cold (69%), fever (63%), and headache (60%). The students consulted their textbooks (39%) and seniors or classmates (38%) for the medications. Antipyretics (71%), analgesics (65%), anti-histamines (37%) and antibiotics (34%) were the most common self-medicated drugs. Out of the respondents 33% were unaware of the adverse effects of the medication and 5% had experienced adverse reactions. The majority (64%) of the students advised medication to others, more often to family and friends. The study concluded that the prevalence of self-medication among medical students was high, facilitated by easy availability of drugs and information from textbooks or seniors. A significant number of students were unaware of the adverse effects of medication that they themselves took and suggested to others. Therefore, potential problems of self-medication should be emphasized to the students.<sup>[41]</sup>

**Sanjeev Badiger et al** conducted a cross-sectional descriptive study at the K.S. Hegde Medical Academy, Mangalore on Self-medication patterns using a pre-tested semi-structured questionnaire. A total of 200 students participated in the study, of whom 121 (60.5%) were female and 79 (39.5%) were male. Among these 200 students, 45 (22.5%), 49 (24.5%) and 106 (53.0%) were studying in their first year, second year and final year respectively. A total of 110 (90.9%) female participants and 74 (94.7%) male participants said they practiced self-medication. All the variables were denoted in multiple response questions. The study found that the conditions prompting self- medication were the common cold (69%), fever (63%) and headache (60%), followed by gastrointestinal ailments, i.e. diarrhea (23%), gastritis (21%) and nausea/vomiting (16%). The classes of drugs that were commonly used were antipyretics (71%), analgesics (65%), antihistamines (37%) and antibiotics (34%). Some potentially harmful drugs were also used, such as sleeping pills (2%), steroids (2%) and stimulants (1.5%). A significant number, 32.6% of the study group, was unaware of the adverse effects of the drugs they took. The study found that 10 students (5.4%) had experienced adverse reactions while on self-medication. Of those who experienced adverse reactions, 50% consulted a doctor and the remaining 50% changed the medication on their own.<sup>[5]</sup>

**Manjushree Nagaraj et al** conducted a study on the dispensing pattern of over the counter drugs in retail pharmacies in sarjapur area, east Bangalore for a period of 10 days. A total of 216 patients frequented the pharmacies during the study hours without prescription. Out of 216 patients, 70.83% were males, and 28.2% were females. Out of them, adults were (84.25%), elderly (12%), paediatrics (2.3%), and adolescents (1.3%). The most common complaint for the use of OTC drugs was pain (26.80%). The other complaints were respiratory infections (24.50%), GIT problems (22.22%), gynaecological problems (5.00%), headache (6.01%), dermatological problems (5.09%), and others (10.18%). Fixed dose combinations dispensed: Sixty six percent of the drugs dispensed were fixed dose combinations. The knowledge about adverse effects of drugs was found only in 13% of the patients. The percentage of patients who were not aware of contraindications or undesirable effects of the drugs was 77%. Nearly 85% of patients considered the information gained from the pharmacists to be sufficient.<sup>[42]</sup>

**Nithin Kumar et al** conducted a cross-sectional study among the undergraduate students of Kasturba medical college, Mangalore during march–April, 2011 on perceptions and practices of self-medication. A total of 440 students were assessed regarding their practice, attitude and perception regarding self medication behavior. out of which 43.2% (n=190) were males and 56.8% (n=250) were females. A proportionately larger number of females were self-medicating (n=203, 81.2%) than males (n=143, 75.3%). Self-medication was proportionately commoner in 3rd year of MBBS. Among the participants practicing self-medication, the majority (n=320, 72.7%) followed allopathic system of medicine, followed by Homeopathic (n=16, 3.6%) and Ayurvedic system of medicine (n=10, 2.3%). The majority of the students self-medicated because of the illness being too trivial for consultation (70.5%). More than half of the study participants (53.1%) used old prescriptions for the same illness as a source for information about the drug. Most of the participants (n=322, 93%) checked the expiry date on the drugs before self-medication. Antipyretics were the most common class of drugs self-medicated by the majority of the participants (74.8%), followed by Antitussives (68.2%) and Analgesics (65.8%). It was also observed that 39.3% of the participants reported to have self-medicated themselves with Antibiotics. Beta lactam group (59.6%) was the most common class of antibiotics frequently self-medicated. Among the various indications for self-medication reported by the students, fever was the most common (75.1%), followed by headache (64.7) and cough/cold (58.7). Sore throat (31.6%) was the most common indication for self-medication with antibiotics.<sup>[43]</sup>

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