

**SELF MEDICATION: A SYSTEMATIC REVIEW****Karna B. Khavane\*<sup>1</sup>, Vidya K. Magar<sup>2</sup>, Sanjay Sharma<sup>3</sup> and Santosh A. Payghan<sup>4</sup>**

<sup>1</sup>Department of Pharmacology, GSBS'S, Gurukrupa Institute of Pharmacy, Majalgaon,  
Dist.Beed-431131, Maharashtra.

<sup>2</sup>Department of Pharmaceutical Chemistry, GSBS'S, Gurukrupa Institute of Pharmacy,  
Majalgaon, Dist.Beed-431131, Maharashtra.

<sup>3</sup>Department of Pharmaceutical Quality Assurance, School of Pharmacy, NMIMS University,  
Shirpur – 425405, Maharashtra State, India.

<sup>4</sup>Department of Pharmaceutics, Vasantidevi Patil Institute of Pharmacy, Kodoli, Kolhapur,  
Maharashtra State, India.

Article Received on  
17 March 2021,

Revised on 07 April 2021,  
Accepted on 27 April 2021

DOI: 10.20959/wjpr20215-20425

**\*Corresponding Author****Dr. Karna B. Khavane**

Department of  
Pharmacology, GSBS'S,  
Gurukrupa Institute of  
Pharmacy, Majalgaon,  
Dist.Beed-431131,  
Maharashtra.

**ABSTRACT**

Self-medication can be defined as obtaining and consuming drugs without the advice of a physician for diagnosis, prescription or surveillance of treatment. It aims to find the reason of self medication and make public aware about its effects and side effects. People use it for the treatment of any disease symptoms or minor ailments by their self initiative. The adverse consequences of such practices should always be emphasized to the community and steps to curb it. Rampant irrational use of OTC drugs without medical guidance may result in greater probability of inappropriate, incorrect, or undue therapy, missed diagnosis, delays in appropriate treatment and increased morbidity. There is need to augment awareness and implement legislations to promote judicious and safe practices. Improved

knowledge and understanding about self-medication may result in rationale use and thus reduce antibiotic resistance issues. The present review deals the reason, hazards, and prevention of potential risk associated with self-medication.

**KEYWORDS:** Self Medication (SM), Role of Pharmacist, Allopathic drugs, OTC drugs, antibiotic resistance.

## INTRODUCTION

“Self-medication is an element of self-care based on selection and use of medicines by individuals to treat self-recognized illnesses or symptoms.<sup>[1]”</sup> Self medication is a major form of self-care.<sup>[2]</sup> Recent development of the pharmaceutical companies contribute to a wide spread availability of OTC Medicine.<sup>[3]</sup> It is independent of age for both males and females.<sup>[4]</sup> Medicines for self medication are often called Over the Counter (OTC) drug, which are available without a Doctor’s prescription through pharmacies, mostly in the less developed countries<sup>[5,6]</sup> Its irrational use increases the risk of adverse events, bacterial infection, Hypersensitivity, Drug withdrawal symptom and of masking disease which can delay correct diagnosis.<sup>[7,8,9,10]</sup> It has been argued that self-medication empowers patients by giving them independence to choose in minor illness in case of over the counter (OTC) drugs. Major problems related to self-medication are wastage of resources, increased resistance of pathogens and causes serious health hazards such as adverse reaction and prolonged suffering. Antimicrobial resistance is a current problem world-wide particularly in developing countries where antibiotics are available without any prescription.<sup>[11,12]</sup> Its irrational use increases the risk of adverse events, bacterial infection, Hypersensitivity, Drug withdrawal symptom and of masking disease which can delay correct diagnosis.<sup>[13,14,15,16]</sup> Practiced globally, Self-medication is an important public health problem, with a reported prevalence of 0.1% in northern and western Europe, 21% in Eastern Europe, 27% in USA.<sup>1,8-12</sup> In developing countries reported SM prevalence rates are much higher with e.g. 84% in Pakistan, 78% in Saudi Arabia, 67% in Nigeria and 79% in India.<sup>[17,18,19,20]</sup>

It is linked to perceived quality of a country’s health care system, even in industrialized countries: many simple medications are available for routine use and are sold in Drug store and supermarket also.<sup>[21]</sup>

Self medication particularly with antibiotics has been widely reported leading the WHO to call attention to the dangers of self medication as a cause of antibiotic resistance.<sup>[22,23,24,25,26]</sup> In India there is a wide range of drugs used as a self medication compared to prescribed drugs, show in Table 1.<sup>[27,28,29]</sup>

**Table 1: List of drugs used for self medication.**

Sr. No.	Category	Drug
1.	Cough & Cold	D-Cold total, Corex ,Benadryl, Glycodin
2.	Analgesics	Saridon, Disprin, Nise, Diclofenac, Nimesulide
3.	Antipyretics	Paracetamol, Ibuprofen, Calpol, Crocin
4.	Antiseptic	Dettol, Boroplus
5.	Antibiotics	Ciprofloxacin, Norfloxacin, Amoxicillin, Cefadroxil
6.	Others	Dabur, Chyawanprash Hajmola

**Why do people use self medication?**

Modern consumers (patients) wish to take a greater role in the maintenance of their own health and are often competent to manage (uncomplicated) chronic and recurrent illnesses (not merely short-term symptoms) after proper medical diagnosis and with only occasional professional advice, e.g. use of histamine H<sub>2</sub>-receptor blocker, topical corticosteroid, antifungal and oral contraceptive. They are understandably unwilling to submit to the inconvenience of visiting a doctor for what they rightly feel they can manage for themselves, given adequate information.<sup>[30]</sup> Self-medication is very common and a number of reasons could be enumerated for it<sup>[31]</sup> Urge of self-care, feeling of sympathy toward family members in sickness, lack of time, lack of health services, financial constraint, ignorance, misbelieves, extensive advertisement and availability of drugs in other than drug shops are responsible for growing trend of self-medication.<sup>[32]</sup>

**Reasons of self medication**

Self medication is very common and a number of reasons could be enumerated for it.<sup>[33]</sup> Urge of self-care, feeling of sympathy toward family members in sickness, lack of time, lack of health services, financial constraint, ignorance, misbelieves, extensive advertisement and availability of drugs in other than drug shops are responsible for growing trend of self-medication.<sup>[34]</sup>

**Self-Medication in over the Counter (OTC) and Prescription drugs**

Drugs that are legally allowed to be sold without any consent of registered medical practitioner's prescription are known as Over the Counter (OTC drugs). (Drugs @ FDA Glossary of Terms. 2011). As OTC drugs can be procured without any prescription they are easily accessible and contributes majorly in self-medication. Habitual OTC drugs that are easily available are painkillers, cold and flu, anti-allergy medicine, vitamins and energy tonics. The most common reasons of self-medications were found to be fever, cold & cough

and headache.<sup>[35]</sup> World Health Organization considers self medication as a part of the self care that helps efficient use of the troubled healthcare awareness system. (World Health Organization, 2011) with all legal aspects taken into considerations for use of drugs for self medication. Enlarging the list of OTC drugs and increasing availability of controlled drugs gives the people freedom of choosing the type of treatment they want to undergo. In spite of being useful in treating common ailments, surplus use of OTC drug can lead to undesired effects and reactions. Strict measures are needed to monitor advertisements of medicines both in print and electronic media.

The possibility of having access to medicines not listed as OTC drugs should be minimized by taking appropriate monitoring measures including implementing effective legislation.<sup>[36]</sup> James H. in his study done among first-year medical students of the Arabian Gulf University, Bahrain found that knowledge about appropriate self-medication was usually poor, attitude towards self-medication was positive, and the practice of self-medication was common and often inappropriate.<sup>[37]</sup> A study conducted on medical students concluded that in spite of knowing the ill effects, medical students still prefer to practice self-medication. Antipyretic, analgesics and antacids are most commonly used drugs for self-medication.<sup>[38,39,40]</sup>

The study conducted in Kathmandu Valley, Nepal showed that non-steroidal analgesic, anti-inflammatory and antipyretic drugs were mostly preferred for the treatment of fever and headaches. Community pharmacies and pharmacist recommendation were main sources of obtaining and selecting particular medicine and its dose while friends and family were the main source of information Majority of the respondents always checked up the information on package label or insert, mainly date of manufacturing and also checked the expiry date before medicating. Significant proportion of respondents perceived it as unacceptable practice. Allopathic system was preferred over other systems for self-medication.<sup>[41]</sup>

A study on reproductive age women was conducted to understand severity of self-medication. The study concluded that mostly women practice self-medication when they suffer from headache, dyspnea, leg pain, cold, fever, indigestion and their primary source of information about medicines are health magazines, advertisements along with information by friends. Analgesia and antipyretics were most frequently used drugs.<sup>[42]</sup>

The most common self-administrated medicine is antibiotics. Antibiotics are usually used to prevent bacteria from spreading or reproducing. It doesn't act on viral infection such as cold

flu, cough and throat infection. Study conducted in Greece to understand self-medication behavior of students of medicine and dentistry towards antibiotics revealed that 22.4 % of respondents self-medicated with antibiotics the last 6 months for ailments like pain, cough and fever. Out of which majority of the students were from medicine. Moreover, only half of self-medicated students completed the full course, in fact many of them were taking wrong dosages during the treatment period and few also reported adverse events related to antibiotics. The main reason reported for not visiting a medical doctor, was the use of the same antibiotic in the past.<sup>[43]</sup> Antibiotic consumption has been strongly linked with the development of resistance as specific antibiotics are developed to cure specific bacteria. Hence, taking antibiotics of previous prescription for different condition might built resistant bacteria that will make it hard for curing.<sup>[43,44,45,46,47,48]</sup> The major problem highlighted in studies related to self-medication of antibiotics was that patients were not aware about how much dose was to be administrated and when to stop taking medicines and consult doctor. Patients were also not fully aware about the ill effects of self-medication such as adverse drug reaction, drug-drug interactions, and other side effects.<sup>[39,40,42]</sup>

### **Prevention of potential risks Associated with Self-medication**

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>[49]</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>[49]</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>[49]</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>[49]</sup>

### **Duties of pharmacist**

Duties of the pharmacist have been changing over the past two decades with self treatment increasing worldwide.<sup>[50]</sup> He can play a key role in giving advice to consumers on the proper and safe use of medicinal products intended for self medication. It is important, therefore to take this role into account both in their training and in practice.

In other words pharmacists play a valuable role in identifying, solving, and preventing drug-related problems (DRPs) 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 are uniquely trained to assist patients in the selection of appropriate drug therapy and the circumstances under which a physician should be consulted before patients embark upon independent self-care.<sup>[51]</sup> Unlike above role, Pharmacists have following function.<sup>[52]</sup>

### **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>[49,53]</sup>

### **Quality drug supplier**

The pharmacist must ensure that the products he/she purchases are from reputable sources and of good quality.<sup>[49,53]</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>[49,53,54]</sup>

### Collaborator

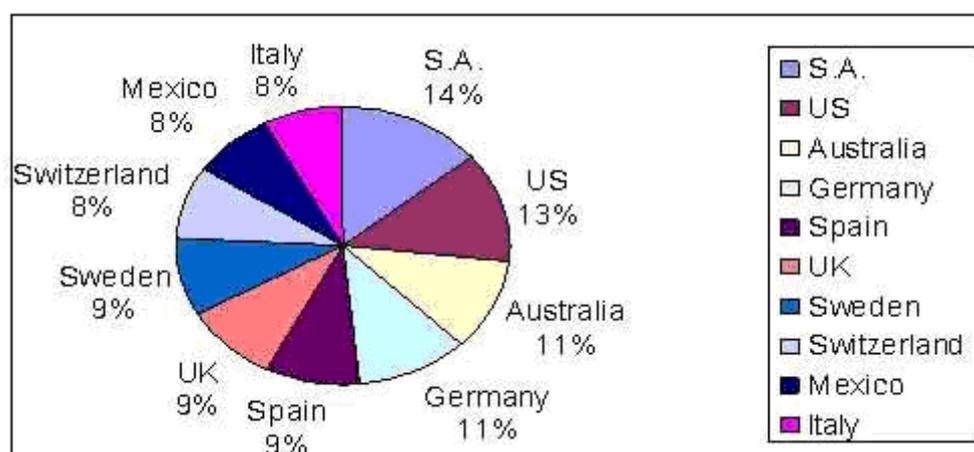
It is imperative that pharmacists develop quality collaborative relationships with the other health care professionals, national professional associations, the pharmaceutical industry, governments (local/national), patients and general public.<sup>[49,53,55]</sup>

### 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>[49,53]</sup>

### Self medication: World wide

The concept of self medication which encourages an individual to look after minor ailments with simple and effective remedies has been adopted worldwide.<sup>[34]</sup> People hold the view that medicine should be used in the event of any sickness or discomfort. In the United Kingdom where on the average 50% of health care takes place within the realm of self medication.<sup>[56]</sup> Self medication is very common now a days and it is being used worldwide, given in (Fig.1)<sup>[57]</sup>



### **Positive outcomes of Self-Medication**

Self-medication also has advantages for healthcare systems as it facilitates better use of clinical skills, increases access to medication and may contribute to reducing prescribed drug costs associated with publicly funded health programs.<sup>[58]</sup>

### **Hazards of Self-Medication**

#### **Individual level**

- Inaccurate self-diagnosis
- Failure to inquire about suitable medical advice promptly
- Inaccurate choice of therapy
- Fail to recognize unusual pharmacological risks
- Uncommon but severe adverse effects
- Fail to diagnosis of contraindications, interactions, warnings, and precautions
- Fail to distinguish that the same active substance is already being taken under a different name
- Fail to report recent self-medication to the prescribing physician (double medication/harmful interaction)
- Fail to recognize or report adverse drug reactions
- Incorrect route of administration
- 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>[59]</sup>

#### **Community level**

Improper self-medication could result in an increase in drug-induced disease, tolerance, resistance in the body, and in wasteful public expenditure.<sup>[59]</sup>

#### **Safe use of self medication**

Safety in self medication (an overriding requirement) depends on four parameters<sup>[60]</sup>

1. Drug: Its inherent properties, dose and duration of use, including its power to induce dependence.
2. Formulation: devised with unsupervised use in mind, e.g. low dose.

3. Information: available with all purchases (printed) and rigorously reviewed (by panels of potential users) for user friendliness and adequacy for a wide range of education and intellectual capacity.
4. Patient compliance.

### **How do people get information for self medication?**

There are various sources from where people get information<sup>[61]</sup> like, a pharmacist, Household members, product information leaflet, friends, relatives (not healthcare professionals), and advertisements.

### **Promotion of responsible Self-Medication**

The OTC Committee of the Organization of Pharmaceutical Producers of India is working toward the promotion of responsible self-medication with a view to growing the OTC sector in the market. It is aiming to get supervisory support for issues such as the accessibility of household TC remedies and increasing the awareness of the importance of responsible self-medication with the general public and the government.<sup>[62]</sup> Many healthcare organizations have made important statements on self-care and self-medication, singly or jointly with WSMI. Some selected illustrations only are given here.<sup>[63]</sup> The WHO: “It has become widely accepted that self-medication has an important place in the health care system. Recognition of the responsibility of individuals for their own health and awareness that professional care for minor ailments is often unnecessary has contributed to this view. Improvements in people’s general knowledge, level of education and socio-economic status in many countries form a reasonable basis for successful self-medication”<sup>[63]</sup> The FIP: “To have good health, people are becoming more responsible, getting proper information as much as possible to decide in their own care. Pharmacists and the manufacturers of non-prescription medicines share the common goals of providing high-quality service to the public and encouraging the responsible use of medicines” (Joint Statement by The FIP and the WSMI, 1999).<sup>[63]</sup> The international council of nurses (ICN): “Self-medication is a key component of self-care that is particularly significant in an era of increasing chronic illness and well-informed health care consumers. Optimizing responsible self-medication is an important and underused resource for health and provides an opportunity for collaboration and consultation among consumers, nurses, pharmacists, and physicians” (Joint Statement<sup>[63]</sup> by the ICN and the WSMI, 2003).

### **Growth of OTC sales in india**

India's OTC drug market was worth US Dollar 6.38 billion in 2019, with estimated CAGR of 19.4% the market hold evident potential to reach 15.48 billion by 2024. The rise in health conscious consumers and their changing attitude towards self medication are factors propelling increased demand, followed by the growing inclination of pharmaceutical companies towards OTC drugs from Prescription drugs.<sup>[64]</sup>

### **CONCLUSION**

Several research papers show that self medication is a global phenomenon Self-medication of antibiotic is an alarming concept. This review focused on the self-medication of allopathic OTC drugs, their use, its safety, and reason for using it. It would be safe and if the people who are using it, have sufficient knowledge about its dose, time of intake, side effect on over dose, but due to lack of information, it can cause serious effects such as antibiotic resistance, hypersensitivity, skin problem, and allergy.

Hence, in India where we have poor economic status, education status as well as poor health care facilities. People have less knowledge regarding risks associated with their self-medication, to avoid it is recommended to provide proper awareness and education regarding the self-medication and strictness regarding pharmaceutical advertising. Dispensing modes in the needs to be improved through proper education, strict regulatory, and managerial strategies to make health care easily accessible and cost-effective. Health professionals have to spend some extra time for patient counselling specifically for OTC drugs. Improved knowledge and understanding about self-medication may result in rationale use and thus limit emerging Antibiotic resistance issues.

### **ACKNOWLEDGEMENT**

The authors wish to acknowledge Dr. Yashwant Rajebhonsle Sir, Yashwant Hospital & Criticare, Majalgaon & Principal, GSBS's, Gurukrupa Institute of Pharmacy, Majalgaon Dist. Beed for their valued support & Co-operation.

### **CONFLICT OF INTEREST**

The authors declare no conflict of interest.

**AUTHORS CONTRIBUTION STATEMENT**

Dr. Karna B. Khavane and Prof. Vidya K. Magar conceived of the presented idea. Dr. Karna B. Khavane and Prof. Vidya K. Magar developed the theory and performed extensive literature survey. Dr. Santosh A. Payghan and Dr. Shailesh Patwekar verified, Supervised the data for article. All authors discussed the results and contributed to the final manuscript.

**REFERENCES**

1. World Health Organization. The Role of the Pharmacist in Self-care and Self-medication. Report of the WHO Consultative Group on the Role of the Pharmacist. Technical Report. The Hague, the Netherlands: World Health Organization, 1998; 4.
2. Anonymous. Multicenter study on self-medication and self-prescription in six Latin American countries, *Clin. Pharm & Ther*, 1996; 488-493.
3. Hussain A, Khanum A. Self medication among university students of Islamabad, Pakistan- a preliminary study, *Southern Med Review*, 2008; 1(1): 14-16.
4. Davies JNP. Self-medication and patent medicines, *British Medical Journal*, 1944; 15: 87-89.
5. Pawar NV, Jain SK, Sahi SR. Self medication: how safe: Ask to your pharmacist, the *Pharma review*, 2009; 7(47): 150-152.
6. Pawar NV, Jain SK, Sahi SR. Self medication: how safe: Ask to your pharmacist, the *pharma review*, 2009; 7(47): 150-152.
7. Kamat VR and Nichter M. Pharmacies, Self-medication and pharmaceutical marketing in Bombay India 1948, *Soc Sci Med*, 1998; 47(6): 779-794.
8. Dayani G, Luciana MG, Graziela MA, Silvana CT. Responsible self-medication: review of the process of pharmaceutical attendance, *Brazilian J Pharm Sci*, 2009; 45(4): 625-633.
9. Chalker J. Improving antibiotic prescribing in Hai Phong Province, Vietnam: the “antibiotic-dose” indicator, *Bulletin World Health Organization*, 2001; 79(4): 313-320.
10. Bernal BSR, Silva NN. Self-medication in low-income adults in Southeastern Brazil, *Rev Saue Pulica*, 2010; 44(6): 1-6.
11. apkota AR, Coker ME, Goldstein RER, Atkinson NL, Sweet SJ, Sopeju PO et al., Self-medication with antibiotics for the treatment of menstrual symptoms in southwest Nigeria: across-sectional study, *BMC Public Health*, 2010; 10: 1-10.
12. Vizhi SK, Senapathi R. Evaluation of the perception, attitude and practice of self-medication among business students in 3 select Cities, South India. *International*

- Journal of Enterprise and Innovation Management Studies (JEIMS) July-December, 2010; 1(3): 40-4.
13. Pagán JA, Ross S, Yau J, Polsky D. Self-medication and health insurance coverage in Mexico. *Health Policy*, 2006; 75: 170-7.
  14. Dayani G, Luciana MG, Graziela MA, Silvana CT. Responsible self-medication: review of the process of pharmaceutical attendance, *Brazilian J Pharm Sci*, 2009; 45(4): 625-633.
  15. Chalker J. Improving antibiotic prescribing in Hai Phong Province, Vietnam: the “antibiotic-dose” indicator, *Bulletin World Health Organization*, 2001; 79(4): 313-320.
  16. Bernal BSR, Silva NN. Self-medication in low-income adults in Southeastern Brazil, *Rev Saue Pulica*, 2010; 44(6): 1-6.
  17. Sapkota AR, Coker ME, Goldstein RER, Atkinson NL, Sweet SJ, Sopeju PO et al., Self-medication with antibiotics for the treatment of menstrual symptoms in southwest Nigeria: across-sectional study, *BMC Public Health*, 2010; 10: 1-10.
  18. Afridi M, Rasool G, Rabia Tabassum R, Shaheen M, Siddiquillah, Shujaiddin M. Prevalence and pattern of self-medication in Karachi: A community survey. *Pak J Med Sci*, 2015; 31(5): 1241-5.
  19. Al Rasheed A, Umar Yagoub U, Alkhashan H, Abdelhay O, Alawwad A, Al-Aboud A, et al. Prevalence and predictors of Self-Medication with antibiotics in Al Wazarat Health Center, Riyadh City, KSA. *Biomed Res Int*, 2016; 2016: 3916874.
  20. Oshikoya K, Senbanjo I, Njokanma O. Self-medication for infants with colic in Lagos, Nigeria. *BMC Pediatry*, 2009; 9: 9.
  21. Kumar N, Kanchan T, Unnikrishnan B, Rekha T, Mithra P, Kulkarni V, et al. Perceptions and Practices of Self-Medication among Medical Students in Coastal South India. *PLoS ONE*, 2013; 8(8): e72247.
  22. Regina SC, Newton KJ, Edmea RT, Newton KJ, Regina NC. Self-medication: initial treatments used by patients seen in an ophthalmologic emergency room, *Clinics*, 2009; 64(8): 735-41.
  23. Kamat VR and Nichter M. Pharmacies, Self-medication and pharmaceutical marketing in Bombay India 1948, *Soc Sci Med*, 1998; 47(6): 779-794.
  24. Abasaheed A, Jiri V, Mohammed A, Ales K. Self-medication with antibiotics by the community of Abu Dhabi Emirate, United Arab Emirates, *J Infect Dev Ctries*, 2009; 3(7): 491-497.

25. Sarahroodi S, Arzi A, Swalha AF, Ashtranezhad A, Antibiotic self medication among southern Iranian University Students, *International J Pharmacol*, 2010; 6(1): 48-52.
26. Nalini GK. Self medication among allopathic medical Doctor in Karnataka India, *British J med prac*, 2010; 3(2): 325.
27. Calva J. Antibiotic use in a Periurban community in Mexico: A house hold and drug store survey, *Soc Sci med*, 1996; 42: 1121-1128.
28. Verma RK, Mohan L, Pandey M. Evaluation of self medication among professional student in north India: proper statutory drug control must be implemented, *Asian J pharma clin Reas*, 2010; 3: 60-64.
29. Sharma R, Verma U, Sharma CL, Kapoor B. self medication among urban population of Jammu city, *Indian J Pharmacol*, 2005; 37: 37-45.
30. Kanthe RU. Self medication, Doctors and marketing of OTC products, *Asian Journal of Management Research* 2010; 231.
31. Student lancet. Available from: <http://www.thelancetstudent.com>. [Last accessed on 2010 Sep 8].
32. Solomon W, Abede GM. Practice of self-medication in Jimma Town. *Ethiop J Health Dev*, 2003; 17: 111-6.
33. Phalke VD, Phalke DB, Durgawale PM. Self-medication practices in rural Maharashtra. *Indian J Community Med*, 2006; 31: 34-5.
34. Solomon W, Abede GM. Practice of self-medication in Jimma Town. *Ethiop J Health Dev*, 2003; 17: 111-6.
35. Phalke VD, Phalke DB, Durgawale PM. Self-medication practices in rural Maharashtra. *Indian J Community Med*, 2006; 31: 34-5.
36. Ghosh, A., Biswas, S., Mondal, K., Haldar, M., & Biswas, S. A Study on Knowledge and Practices of Over the Counter Medications among 2nd Year Medical Students. *world journal of pharmacy and pharmaceutical sciences*, 2015; 2.
37. Hussain, A., & Khanum, A. Self medication among university students of Islamabad, Pakistan - A Preliminary Study. *Southern Med Review*, 2008; 14-16.
38. H, James, SS, Handu, AJ, Khaja, A, K., S, Otoom., & RP, Sequeirar. Evaluation of the knowledge, attitude and practice of self-medication amongst medical students. *Med Princ Pract*, 2006; 1: 270-275.
39. Kasulkar, A. A., & Gupta, M. Self Medication Practices among Medical Students of a Private Institute. *Indian Journal of Pharmaceutical Sciences*, 2015; 178-182.

40. Parakh, R., Sharma, N., Kothari, K., Parakh, R., & Parakh, P. Self -Medication Practice Among Engineering Students in an Engineering College in North India. *The Journal of Phytopharmacology*, 2013; 30-36.
41. Marak, A., Borah, M., Bhattacharyya, H., & Talukdar, K. A Cross-Sectional Study on Self-Medication Practices Among the Rural Population of Meghalaya. *International Journal of Medical Science and Public Health*, 2016; 1134-1138.
42. Bhattarai, N., Basyal, D., & Bhattarai, N. Self medication practice among undergraduate pharmacy students in Kathmandu Valley, Nepal. *International Journal of Pharma Sciences and Research*, 2014; 737-746.
43. Nair, M. S., Rajmohanan, T., & Kumaran, J. Self Medication Practices of Reproductive Age Group Women in Thiruvananthapuram District, South India: A Questionnaire – Based Study. *Journal of Pharmaceutical Sciences and Research*, 2013; 220-225.
44. Pourzitaki, C., Papazisis, G., Tsaousi, G., Geropoulos, G., Drosos, C., Apostolidou, E., & Kouvelas, D. Self-Medication Practices With Antibiotics in Students of Medicine and Dentistry in Greece. *Clinical Therapeutics*, 2017; 39: 8-63.
45. SL, B Bronzware, O, Cars., U, BBuchholz., S, Molsad., W, Goettsch., IK, Veldhuijzen., European Antimicrobial Resistance Surveillance System, E. A. A European study on the relationship between antimicrobial use and antimicrobial resistance. *Emerging Infectious Diseases*, 2002; 278-282.
46. Bilal, M., Haseeb, A., Khan, M. H., Arshad, M. H., Ladak, A. A., Niazi, S. K., . . . Manji, A. A.-K. Self-Medication with Antibiotics among People Dwelling in Rural Areas of Sindh, 2016.
47. Al-Azzam, & Sayer. Self-Medication with Antibiotics in Jordanian Population. *International Journal of Occupational Medicine and Environmental Health*, 2007.
48. Dawooda, O. T., Hassalia, M. A., & Saleem, F. Factors Affecting Knowledge and Practice of Medicine Use Among the General Public in the State of Penang, Malaysia. *Journal of Pharmaceutical Health Services Research*, 2017; 51–57.
49. Porteous, T., Bond, C., Hannaford, P., Sinclair, & Hazel. How and Why are Non-prescription Analgesics Used in Scotland. *Family Practice*, 2005; 22(1): 78–85.
50. Hernandez-Juyol M, Job-Quesada JR. Dentistry and self-medication: A current challenge. *Med Oral*, 2002; 7: 344-7.
51. Chalker J. Improving antibiotic prescribing in Hai Phong Province, Vietnam: the “antibiotic-dose” indicator, *Bulletin World Health Organization*, 2001; 79(4): 313-320.

52. Kerry W, Samah ES, Ebrahim M. Patient perceptions of pharmacist roles in guiding self medication of over the counter: therapy in Qatar, Patient Preference and Adherence, 2010; 4: 87–93.  
[http://whqlibdoc.who.int/hq/1998/WHO\\_DAP\\_98.13.pdf](http://whqlibdoc.who.int/hq/1998/WHO_DAP_98.13.pdf) (accessed April 15, 2011)
53. Role of the pharmacist in the health care system. Available from: <http://www.apps.who.int>. [Last accessed on 2010 Sep 9].
54. Ruiz ME. Risks of self-medication practices. *Curr Drug Saf*, 2010; 5: 315-23.
55. Available from: <http://www.pharmahost.org>. [Last accessed on 2010 Sep 8].
56. Afolabi AO. Factors influencing the pattern of self-medication in an adult Nigerian population, *Annals of African Medicine*, 2008; 7(3): 120-127.
57. [http://abimip.org.br/uploads/material\\_de\\_apoio/1296056417\\_792.pdf/](http://abimip.org.br/uploads/material_de_apoio/1296056417_792.pdf/) (accessed April 10, 2011)
58. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self-medication. *Drug Saf*, 2001; 24(14): 1027-37.
59. WHO. Guidelines for the Regulatory Assessment of Medicinal Products for use in self-Medication. Geneva: WHO, 2000.
60. Self medication: Bennett PN, Brown MJ. *Clinical pharmacology*, IJPBA, Churchill Livingstone, 2003; 9: 25-26.
61. Vedrana AV, Vladimir T, Zdravko L. Content of Home Pharmacies and Self-Medication Practices in Households of Pharmacy and Medical Students in Zagreb, Croatia: Findings in 2001 with a Reference to 1977, *Croat Med J*, 2005; 46(1): 74-80.
62. Available from: <http://www.indiaoppi.com/IndiaOTCpharmaProfile2011.pdf>. [Last accessed on 2015 Nov 15].
63. Available from: [http://www.wsmi.org/news/news\\_113.htm](http://www.wsmi.org/news/news_113.htm). [Last accessed on 2015 Nov 22].
64. <http://www.expresspharma.in/latest-updates/otc-healthcare-products-a-growth-area-for-india-pharma-inc/>