

# Self-medication in Developing Countries a Systematic Review

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**Abstract:** Self-medication is common in developing countries where it has both economic and social implications. On the one hand, it is viewed as a large component of self-care, which relies heavily on the consumer's expertise in terms of experience of the consumer, when it comes to medication use. On the other hand, if not practiced correctly it can lead to multiple issues including abuse and drug resistance. Across surveys conducted in developing countries the reasons why people self-medicate has been studied, to understand the determinants of self-medication and to explain the influence of knowledge and information on self-medication practices. To understand the same a detailed systematic literature review based on survey findings on self-medication in developing countries was carried out. From a total of 52 survey articles, 25 surveys were selected for the present review. From the survey outcomes it was found that the cost, time and past experience with the medicine and symptom were key determinants while healthcare professionals emerged to be the primary sources of information and knowledge for self-medication practices. The prevalence of self-medication as a phenomenon is high and it has both potential benefits and associated risks with it. To ensure that the risks and benefits of medicine usage are known by consumers, we really need to look at and design suitable interventions to promote responsible self-medication and in turn, rational drug use in the developing world.

**Keywords:** Self-medication, determinants, phenomenon, review, medicine

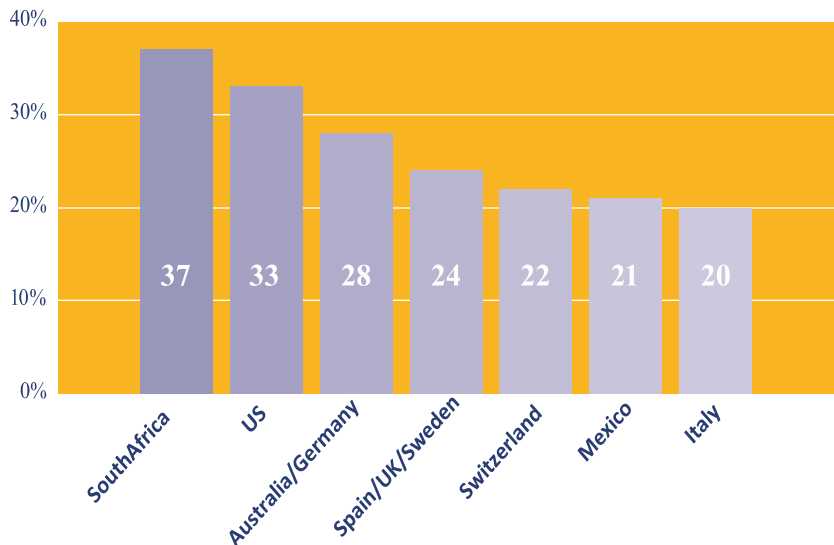
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## 1. INTRODUCTION

‘Self-medication’ is a global phenomenon. On the one hand, it is viewed as a large component of self-care, which relies heavily on the consumer’s expertise in terms of experience of the consumer, when it comes to medication use. On the other hand, if not practiced correctly it can lead to multiple issues including abuse and drug resistance.

Across the world, a consumer on an average suffers from at least one aspect of un-wellness in a 4-week period. Accordingly, 50% of people wait for the symptoms to subside, 25% take resort of prescription medicines while the remaining 25% turn to OTC (over-the-counter) medicines for relief. The graph below shows percentage of conditions treated with OTC’s by consumers in 10 nations. US and South Africa has the highest percentages of self-medication, only the reasons differ. While in the US it is more of a cost and time saving alternative, in South Africa it is high due to lower levels of infrastructure and professional staff. (wsmibro.pdf, 2005)

The WHO guidelines 2000 define self- medication as the use of medication by a patient on his own initiative or on the advice of a pharmacist or a lay person instead of consulting a medical practitioner. While in most of the developed world, it is synonymous with use of over-the-counter medications (responsible self-medication); the developing world faces a vast plethora of issues around



**Graph1:** Percentage of common conditions treated with OTC’s.

the phenomenon. Some of these issues could be highlighted as self-medication with prescription drugs, misuse of antibiotics, overuse of injections, overuse of relatively safe medicines and unsafe use of herbal medicines (Hardon Anita et al, 2001).

Accordingly, the following two types of self-medication are commonly practiced worldwide and can be represented thus:

Self –medication in developing countries can be better understood as a phenomenon within the following two contexts (Geest Van Der Sjaak et al, 1990):

1. Economic-Infrastructural context: Accessibility to primary healthcare, Cost of medicines and development of alternative system of treatment are major concerns. For example: In rural areas in many developing countries like Cameroon for example, the public health system does not function properly, hence an alternative system develops.
2. Cultural-Cognitive beliefs: There are underlying beliefs that individuals hold when it comes to medicine use and are specific to communities and regions around the world. For example, Guatemalan villager’s categorized medicines as hot or cold based on their own classification system.

According to a survey conducted on 20, 000 consumers in 10 cities in India by Lybrate (doctor- patient –end-to-end communication platform)), it was found that over 52 % Indians indulge in self-medication practices (The Hindu, New Delhi, April 2015). Most studies reporting prevalence of self-medication are very specific (with respect to regional and cultural contexts). As reported (Sandeep A et al, 2013) prevalence rates are high, 68% in European countries and as high as 92% for adolescents in India. Such high prevalence rates are a

**Table 1:** Self-medication (worldwide)\*.

Responsible Self-medication	Irresponsible self-medication
Wide acceptance and availability of OTC products	Wide acceptance and availability of both OTC and prescription products
Careful use of OTC products, reading the label	Irrational use of OTC and prescription products (for example, self-prescription, use of prescription products on recommendation, non-medical use of a prescription drug
OTC products usage as safe and effective when compared to prescription products	Probability of Drug-Drug interactions higher due to improper use of different systems of medicine, combined use of OTC and prescription drugs.

\*compiled by the author

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cause of concern in a developing country especially when responsible self-medication is already a huge challenge. As reported in the book, *Advances in Drug research and application*, though there is a vast amount of research being done to measure self-medication practices including in children, there is sparse epidemiological data available worldwide (Ashton Acton, 2011).

According to World Drug Report 2010, the misuse of prescription drugs including opioids, benzodiazepines and synthetic prescription stimulants is a growing health problem in both developing and developed countries. In their study (Ruiz et al, 2010) the authors have highlighted the dangers of self-medication including polypharmacy, dependence and drug interactions. Thus, it becomes important to understand the various dimensions of this phenomenon including risks and benefits so that appropriate health interventions can be designed to promote rational drug use in the country.

## **2. OBJECTIVE**

The main objective of this systematic review on self-medication is:

1. To identify the determinants of self-medication practices in developing countries.
2. To study the influence of knowledge and information on self-medication in developing countries.

## **3. METHODOLOGY**

A manual search strategy was adopted to obtain research papers on Self-medication in developing countries. The search was primarily carried out using PUBMED, Ebsco, Proquest and Google scholar search engines and the key words used for the search were self-medication, reasons and determinants. A total of 52 survey articles were thus obtained.

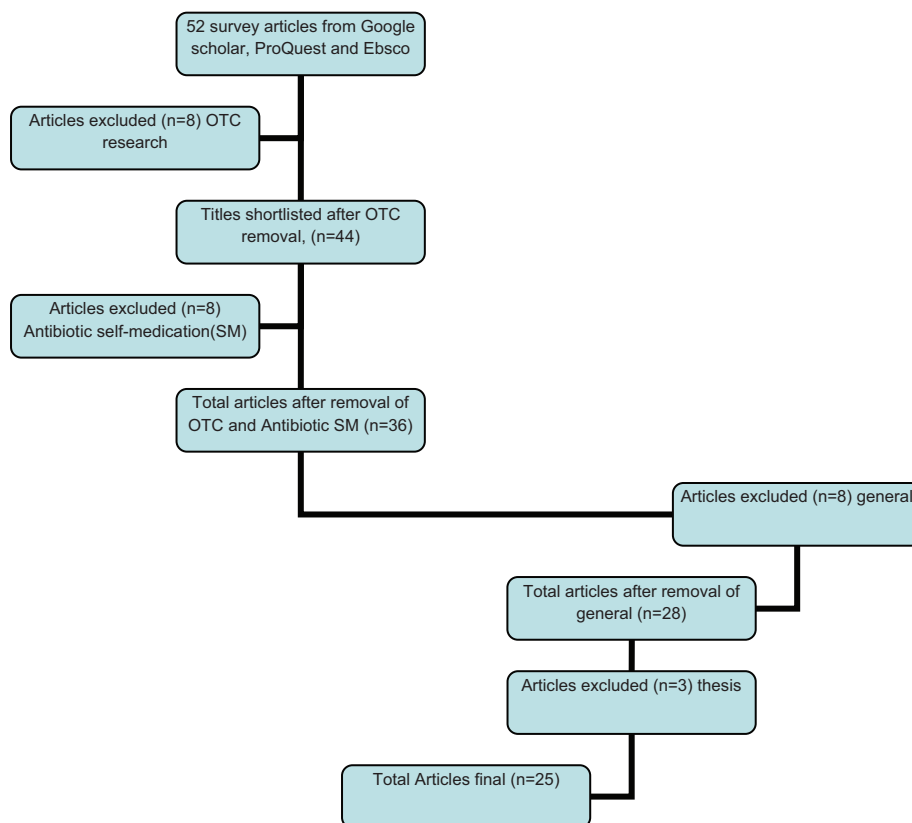
See **Figure 1** for flowchart of the articles selected for this review:

### **3.1 Inclusion and exclusion criteria**

Articles are included based on types of surveys conducted, sample size, research methodology adopted and findings. Surveys conducted in the developed countries in the west were deliberately not included to take into account the economic and infra structural contexts unique to developing countries.

Studies selected for the review were surveys on self-medication in developing countries in the time period year 2000 to 2016. From a total of 52 different surveys conducted in developing countries, 25 were selected for this review. They were accordingly numbered as S1 to S25. These surveys were included based on the following criteria:

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**Figure 1:** Flow chart showing the selection of articles for review.

1. Studies included a population of both young and elderly. Because self-medication is being increasingly practiced by the young, which has its own, associated risks, it is necessary to understand the determinants and influence of information across these varying segments of the population.
2. Studies necessarily had information about the reasons or factors that promote or lead to an increase in the self-medication habits in consumers.
3. Surveys had a sample size of over 100 respondents
4. Surveys on children, pregnant women were excluded from the review.

The 25 survey articles selected for the review were then read and information obtained from them was used for analysis. **Table II** lists the summary of these selected studies.

**Table 2:** Summary of included studies.

Study	Country	Prevalence of Self-medication	Study Methodology	Proportion of sample participants	Length of study	Types of requests for Self-medication
S1 Pankaj Jain, Indo-global journal of Pharmaceutical Sciences, 2012	Haryana, India	37.4% of which 28.2% was by Self-medication before they came for current self-medication	Survey method in community pharmacies-structured interview questionnaire	680 females (actual drug users and messengers)  1225 males (actual drug users and messengers)	One year	40.1% were for Anti-microbial
S2 Pahuja Ritu, IJDDR, 2011	Delhi, India	61% (analgesics and antipyretics)	Descriptive survey- online exploratory. Judgmental sampling technique	103 (out of 342 respondents)  Response rate:30%	Five months	67%- Crocin-fever Azithromycin and D-cold- 29.8% and Vicks Action 500 -cold 25.5%
S3 Rohit Verma, Asian journal of pharmaceutical and clinical research, 2010	North India	87.0% (professional students)	Questionnaire based descriptive survey	1022 students (1075 total participants)	Not specified	61.27%- Crocin followed by Disprin and Combiflam
S4 Pankaj Gupta, Asian journal of Pharmaceutical and clinical research, 2011	India (urban slum community)	55.9%	Cross sectional study	760 households (268 males, 492 females)	Not specified	Meds for headache, fever, aches, allergies and diarrhoea. old drug packs, old prescriptions shown or symptoms explained

S5 Malvi Ritesh, IRJP 2011	Bhopal, India	77.3%	Questionnaire based survey	116 people (58.6%- male, 41.3%- female)	Not specified	Fever and pain categories. Paracetamol, Disprin, Combiflam and Ciprofloxacin. OTC were used for SM
S6 Zafar Syed, Journal of Pak Med Assoc., 2008	Karachi, Pakistan	76%	Cross sectional survey	572 participants (Male: female ratio 1:1.5) 295 medical students and 277 were non-medical students. Response rate 95.3%	Jan-Feb 2007	Headaches, fever and flu like symptoms
S7 Sontakke SD, Int. journal of Biological and Medical Research, 2011	Nagpur, India	77.98%- 1 <sup>st</sup> year, 74.71%- 3 <sup>rd</sup> year	Comparative study between first year and third year medical students. Cross-sectional study, pre-validated questionnaire.	159 – 1 <sup>st</sup> year (89 men, 70 women) 178- 3 <sup>rd</sup> year (106 men, 72 women)	Not specified	Analgesics and antipyretics followed by anti-histaminics and antimicrobials
S8 Husain et al, African journal of Pharmacy and Pharmacology, 2011	Pakistan	15.7 % in urban areas To 8.3% in rural areas.	Randomized cross sectional multi-center study	1850 houses, 550 rural and 1300 urban. Response rate 1850/2100- 88.10%	June 2009- May 2010	Modern drugs available in 64.2% of households. 63%- medicines from local pharmacies in urban areas

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**Table 2:** Continued

Study	Country	Prevalence of Self-medication	Study Methodology	Proportion of sample participants	Length of study	Types of requests for Self-medication
S9 S. Kayalvizhi, IJEIMS	South India	80.13%	Questionnaire based descriptive study	1017 respondents, 605 –male, 412- female	September – November 2010	Headache, fever and cough, cold and sore throat.
S10 Girma Belecha Gutema, J of Applied Pharmaceutical Sciences, 2011	Ethiopia	43.24%	Descriptive cross sectional study	307 health sciences students. 283 respondents, response rate – 92.2%	April- June 2011	Paracetamol, NSAIDS followed by antibiotics
S11 P.R.Shankar, Partha Shenoy, BMC Family Practice 2002	Nepal	59%of respondents had self-medicated in the 6 months preceding the study	Semi-structured questionnaire based study	142 respondents, 117 –males, 25- females	August 2001	Paracetamol followed by analgesics
S12 A.O.Afolabi, Annals of African Medicine, 2008	Nigeria	59.5- 72.1%	Pretested semi structured questionnaire	205 market women	Not specified	Meds recognized by trade or generic names
S13 Al Motassem M.Youssef, Pharm World Sci.2008	Jordan	42.5%	Cross sectional observational study	819 out of 1326 patients (61.2%)	December 2003 and April 2004	No specific category mentioned, meds asked for by brand names



S14 Henry James, Med Princ. Pract, 2006	Bahrain	44.8%	Questionnaire based descriptive study	153 students, 43 males and 91 females	November 2004	Headache, cough and cold, sore throat
S15 Pushpa R Wijesinghe, WHO South-East Asia Journal of Public Health, 2012	Sri Lanka	33.9%- urban, 35.3%- rural	Community based cross-sectional study	1800 respondents, 94.9% response rate	2010	No specific category mentioned
S16 Husain S.Mallik, Self-med behavior in Pakistan, Southern Med Review 2010	Pakistan	7.1%- rural, 2.6%- urban	Randomized cross sectional questionnaire based study	1346 households	January 2007- July 2008	Antibiotics, analgesics, vitamins and minerals
S17 Balamurugan E, BJMP, 2011	South India	71%	Cross sectional survey	200 participants	6 months in 2009	Headache, stomach ache, cough and fever
S18 Fernando Ruiz," SM in older people", Drugs Aging 2009	Mexico	50% and more	Observational, descriptive, cross sectional study	245 older adults (152 women and 93 men )	September and October 2006	Muscle and joint pain, upper respiratory tract and cough
S19 Sonia et al,"Conditions, frequencies and socio demographic factors leading to self-medication in Sargodha, Pakistan, 2013	Pakistan	83%	Descriptive, cross-sectional study	300 university students	January to April 2013	Meds for headache, common cold, cough, fever, constipation, diarrhea.

**Table 2:** Continued

Study	Country	Prevalence of Self-medication	Study Methodology	Proportion of sample participants	Length of study	Types of requests for Self-medication
S20Sandeep A, "Self-medication: Knowledge and practice among rural and urban population"2013	Mandya, Madhya Pradesh	42.5%	Questionnaire based survey	120 respondents	March and April 2013	Fever relieving meds, pain killers, cough medicines and anti-allergics
S21Shyam Sunder Keshari, "Prevalence and pattern of self-medication practices in rural Barabanki", 2014	Barabanki, Uttar Pradesh	69.6%	Cross-sectional House-to-house survey	168 respondents	October 2013 to March 2014	Fever, pain, respiratory symptoms followed by infections, headache and diarrhoea
S 22Akram Ahmad, Muhammad Umair Khan "Evaluation of knowledge, attitude and practice about self-medication among rural and urban north Indian population, ijper 2015	Moradabad, Uttar Pradesh	100.0% (socio-economic background)	Community based cross-sectional study	380 respondents	March to May 2014	Analgesics, alarming use in chronic conditions in rural areas.
S23Varun Kumar, Abha Mangal"Prevalence and pattern of self-medication in an urban area of Delhi, India 2015	Delhi	92.8% (urban areas)	Cross-sectional study	236 respondents	March and April 2013	Common cold and fever

S24Nagarajiah BH, "Prevalence and pattern of self-medication practices among population of three districts of South Karnataka, 2016	Karnataka	78.63%	Questionnaire based study	5489 respondents	2016	Joint pains, gastric symptoms, headache, fever
S25Aravamuthan Anandhasayanam," Assessment of self-medication practices, consumers drug knowledge and consumption patterns at Tirur city, Kerala, 2016	Kerala, India	62.2%	Questionnaire based survey	500 respondents	May 2014 to Feb 2015	Respiratory tract infection, GI infection, headache and fever.

## **4. RESULTS**

The surveys selected were mainly of descriptive, cross-sectional, questionnaire type and the duration of the study ranged from two months to one year. Total number of respondents studied was 19, 973 across the 25 surveys. These surveys were carried out independently in the countries during the period 2000-2016. The respondents included young students in colleges with both a medical and non-medical background and adults among others. Many of the surveys were conducted in Asia of which fourteen were in India, three in Pakistan and one was conducted in Sri Lanka.

## **5. DISCUSSION**

### **5.1 Self-medication prevalence**

The overall prevalence of self-medication ranged from 8.3% (Husain et al, 2011) in the sample population studied to 87% (Husain S, 2010) across the 25 surveys selected for the review. S22 (socio-economic background of sample) and S23 (only urban areas) had higher prevalence rates but the data on prevalence was not considered due to limitations of the samples. In some studies, self-medication prevalence was higher in females, 59.8% vs 48.9% in males (Gupta Pankaj et al, 2011, Balamurugan E, 2011)

### **5.2 Determinants of self-medication practices**

Across the surveys, lack of time, cost saving and mildness of disease/symptoms were cited as the major reasons for self-medication. (Verma Rohit, 2010, Sontakke SD, 2011, Balamurugan E, 2011, Malvi Reetesh, 2011) Socio-economic conditions, prior experience with the medicine and emergency use were the other key determinants. (Pahuja Ritu, 2011, Gupta Pankaj, 2011, S.Kayalvizhi, 2010, James Henry, 2006). Expected self-medication was higher in urban areas than in rural areas (Wijesinghe Pushpa, 2012). No major differences were noticed in self-medication patterns in men and women. Categories of medicines that were utilized for self-medication range from analgesics, anti-microbials, anti-pyretics and antibiotics. Vitamins and minerals are also common categories used for self-medication by consumers. (Husain S, 2010). It was interesting to note that selection of products for self-medication was based on previous experience with the similar medicine or disease symptoms. (Al Motassem, 2008, Zafar Syed, 2008, Afolabi A.O., 2008).

There is an emerging trend of increasing self-medication in the past five years (2011-2016) and this can be attributed to factors like people showing

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sympathy for ill relatives and friends, unavailability of healthcare services in rural areas, unawareness, misbeliefs and advertisements by pharmaceutical companies (Akram Ahmad, 2015). It was interesting to note that though self-medication has increased among the common population, many of the people consuming drugs by self-medication do not follow instructions regarding dose, duration and instruction for use with many non-prescription drugs thus making them vulnerable to side effects.

The rural areas in India are fast catching up with self-medication practices with reportedly higher percentages of use for analgesics and antipyretics (Akram Ahmad, 2015). In addition, the usage of products by self-medication in chronic conditions is increasing among the rural population, which is an area of concern.

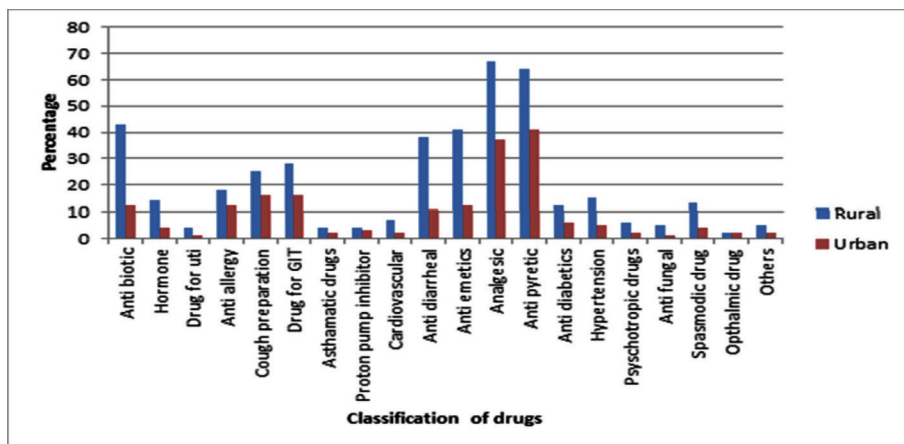
Many of the classes of drugs used by self-medication in developing countries consist of drugs under Schedule H (Drugs and Cosmetics Act, 1940). However; they inevitably are consumed by self-medication without the consumer many times being unaware of their side effects in the dosage consumed. For example in the survey (Malvi Reetesh, 2011) 16 participants (13.7%) used Diclofenac among the analgesics category and 10 participants, (8.6%) used Ciprofloxacin as an antibiotic for self-medication (Total Sample size: 116 participants). In a study (Akram Ahmad, 2015) on rural and urban self-medication pattern in North India, it was found that respondents (380) self-medicated across a wide range of therapeutic categories as shown below:

The above graph clearly indicates that there a lot of drug categories which are being misused by self-medication and the trend is increasing in the rural areas. Most of these drugs have harmful side effects and are known to cause drug-drug interactions when not used carefully with other drugs or drug combinations.

### **5.3 Influence of knowledge/ information on self-medication**

These could be categorized depending on the sources of information and knowledge. Some of the common sources of information are listed below. The percentages listed are specific to particular studies but a pattern could be seen. The most preferred source of information was healthcare professionals followed by friends and family suggesting that medicine use in different cultures across countries may have a major role to play in self-medication habits (Verma Rohit, 2010, Malvi Reetesh, 2011, Pahuja Ritu, 2011, Gupta Pankaj, 2011, S. Kayalvizhi, 2010). It is interesting to note that in most studies, though the respondents were knowledgeable about the medicine used for self-medication, they were not adequately informed about the risks of self-medication, which is really a cause of concern (Zafar Syed,

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**Graph 2:** Consumption of different classes of drugs by participants (Akram Ahmad, 2015).

**Table 3:** Determinants of Self-Medication practices.

Study	Reference	Reasons for Self-Medication
S1	Jain Pankaj, 2012	Emergency use, disease not serious, prevention of diseases, prior experience about the drug, less expensive in terms of time and money.
S2	Pahuja Ritu, 2011	Did not feel the need to consult a doctor for minor illness, unavailability of medical practitioner in nearby community and economical.
S3	Verma Rohit, Asian journal of pharmaceutical and clinical research, 2010	Time saving, did not need advice for minor illness, economic, fear from crowd at clinic.
S4	Pankaj Gupta, Asian journal of Pharmaceutical and clinical research, 2011	No time /could not afford to miss work, mild illness, doctor's clinic too far, monetary constraints, previous good experience with the drug, Not one student had knowledge about complete profile of the drug being consumed by self- medication.
S5	Malvi Ritesh, IRJP 2011	Time saving, did not need advice for minor illness, economic, fear from crowd at clinic.
S6	Zafar Syed, Journal of Pak Med Assoc., 2008	43% alter regimen of prescribed meds, 61.9% stop taking prescribed medicine without consulting a doctor 82.5% felt that it is necessary to consult a doctor before taking a new medicine.  Previous experience, problem too trivial, urgency of problem, advice from friend was enough, convenience, lack of time, cost of consultation, availability of transport.

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S7	Sontakke SD, Int. Journal of Biological and Medical Research, 2011	Time saving, easy availability, convenient and economical.	Self- medication in Developing Countries a Systematic Review
S8	Husain et al, African Journal of Pharmacy and Pharmacology, 2011	Age, gender, education, family, society, law, availability of drugs, exposure to ads and nature of illness. Self-medication leads to inadequate drug utilization patterns.	
S9	S. Kayalvizhi, IJEIMS	Mild illness, previous experience of treating similar illness, economic considerations and a lack of availability of health personnel.	
S10	Girma Belecha Gutema, J of Applied Pharmaceutical Sciences, 2011	Confidence in time in relation to self-treatment. People's belief that only safe medicines are sold without prescription and that OTC medicines do not usually have side effects	
S11	P.R.Shankar, Partha Shenoy, BMC Family Practice, 2002	Alternative medicine-Herbs and medicinal plants- Self-medication. Self-medication was started once fever, headache did not subside in 24 hours. Illness was mild, did not require services of the doctor. Previous experience of similar illness, even if they go they will be prescribed the same medicine.  Patient's satisfaction with healthcare provider, cost of drugs, educational level, socioeconomic factors, age, and gender.	
S12	A.O.Afolabi, Annals of African Medicine, 2008	118 respondents felt it cured their ailment and saved their time and money. 15 felt they had the independence to take care of themselves. For all age groups, respondents used medicines in combination than single doses. Most of the respondents recognized medicines by their trade or generic names.	
S13	Al Motassem M.Youssef, Pharm World Sci.2008	Patients select products based on previous experience with similar products or similar diseases.  Non-prescription drug supply pattern is of three kinds-by prescription, by direct Self-medication (OTC's) and indirect Self-medication –sought advice of pharmacy staff before buying the medicine.	
S14	Henry James, Med Princ. Pract, 2006	Previous experience, mild illness and shortage of time.	

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**TABLE III:** Continued

Study	Reasons for Self-Medication
S15	Wijesinghe R Pushpa, WHO South-East Asia Journal of Public Health, 2012 Self-medication was higher in urban than rural areas of Sri Lanka. Usage of traditional medicines for Self-medication was higher in rural areas. Self-medication was higher in urban males than urban females. Lower number of symptom count as a proxy measure of lower severity of illness emerged as a strong predictor of Self-medication.
S16	Husain S. Mallik, Self-med behavior in Pakistan, Southern Med Review 2010 No differences in health seeking behavior with respect to private sector in rural and urban Pakistan.
S17	Balamurugan E, BJMP, 2011 Self- med in South India Lack of time to visit a doctor (41.5%) followed by minor illness and quick relief. Females were more likely to use Self-medication than males.
S18	Fernando Ruiz,” Self-medication in older people”, Drugs Aging 2009 Self-medication was significantly higher in older people who stayed alone than in those who were married and among the illiterate and who belonged to low socio-economic groups. Muscle and joint pain most common reason for self-medication followed by hypertension. No differences between self-medication practices in men and women.
S19	Imtiaz Sonia et al, Conditions, frequencies and socio demographic factors leading to self-medication in Sargodha, Pakistan, 2013 High consultation cost, minor illness, friends’ advice and easy availability of all drugs from drug stores without prescription.
S24	Nagarajaiah BH, Prevalence and pattern of self-medication practices among population of three districts of South Karnataka, 2016 The most important reason for increase in trend of self-medication is easy availability of all categories of medicines-OTC, prescription or Schedule X drugs without a prescription

2008). Some of the respondents also did not check the expiry date of the medicine before consuming it by self-medication (Gupta Pankaj, 2011). For non-prescription medicines, the physician and pharmacist was the most important source of information for self-medication. **Table IV** lists this information accordingly.



## 7. CONCLUSION

As per the guiding principles in self-medication (WSMI, 1998) “the first key to developing a drug policy which includes self-medication is to draw a distinction between those products which require more active involvement by a doctor or other qualified health professional for safe and effective use-prescription medicines, and those products which are safe and effective for use by consumers on the basis of their marketing authorization and labeling-nonprescription medicines”.

Accordingly, some of the major challenges that can be seen for a developing country with respect to self-medication could be literacy levels in the common population, Affordability of medicines and lack of accessibility to primary healthcare. Easy availability of medicines at pharmacies and convenience stores compounds the problem thus making the consumer vulnerable to risks of self-medication.

It is hence necessary to design interventions to tackle the growing problems associated with self-medication practices. The first step towards achieving this is through educating the masses about the dangers and side effects about the drugs used by self-medication. These programs have to be initiated at the grassroots level in rural areas where there are many consumers who do not hesitate to spend on healthcare and are not at all aware about risks and benefits of drugs being used by self-medication (Wijesinghe Pushpa, 2012, Gupta Pankaj, 2012). The second mechanism in a country like ours would be through active involvement of the pharmacist in patient interactions over-the-counter (Jain Pankaj et al, 2012, Malvi Reetesh, 2011). This is probably the best interface where a healthcare professional can consult the consumer

**Table 4:** Influence of Knowledge/ Information on self-medication.

Sources of Information/Knowledge	Percentage
Doctors	39%
Chemists/Pharmacists	40% and above
Friends	18.9%
Advertisements	25.2%
Family	18.9%
Internet	6.8%
Books	7%
Television	7.1%
Previous prescription	21.5%

**TABLE V: Knowledge/Information and self-medication.**

Article/Survey	Study Design	Year	Sample characteristics	Knowledge/information
S1 Jain Pankaj, 2012	Survey method, structured interview schedule Socio demographic characteristics and prospective SM	May 2009 – June 2010	Haryana –community pharmacies Consumers purchasing drugs without prescription. 1905 responses from 2000 Q in 60 community pharmacies	39%- health professionals, 24%- advice from friends and family 15%- pharmacist 14%-read product information on pack/label
S2 Pahuja Ritu, IJDDR, 2011	Exploratory simple Questionnaire survey.	Feb-June 2011	103 pharmacy students, Judgmental sampling method. Online survey	Information about meds from pharmacies (39.2%). 24.7%- learned SM from past prescriptions of doctors. Friends, advertisements and books were other sources
S3 Verma Rohit, Asian journal of pharmaceutical and clinical research, 2010	Descriptive survey	Jan- march 2010	Adolescent behavior 1022 students, 2 institutions UP technical University	Doctors – 80.82% (prior illness) Friends-36.98% Pharmacists-31.2% Advertisements-13.2% Books-7%
S4 Gupta Pankaj, Asian journal of Pharmaceutical and clinical research, 2011	Cross sectional based study	2011	Urban slum community- Malawi in Mumbai. Semi structured Q 760 families	Local pharmacists-42.1% Previous consultation-25.4% Friends – 13.2% Television-7.1% Internet-3.5% Only 21.4% checked expiry date before using the medicine.

S5 Malvi Ritesh, IRJP 2011	Questionnaire based survey	2011	Descriptive survey, 116 respondents in Bhopal	<p>Chemist- 56.8%          Advertisements-25.2%          Friends –18.9%          Family –18.9%          Internet-6.8%</p> <p>SM(self-medication)- most prevalent          in young males, preference for          allopathic drugs</p> <p>Students stated that they knew it is          harmful to self-medicate but they          lacked complete knowledge. No          significant differences between SM          practices of medical and non-medical          students</p> <p>Awareness of OTC and advts.disadvts.          studied</p> <p>SM – no advts.analgesics and          antipyretics common categories.          Higher use among seniors because          they are more aware of side effects</p> <p>Common among people related to          healthcare. Availability of modern          drugs in both urban and rural areas          analgesics were first followed by          antimicrobials.</p>
S6 Zafar Syed, Journal of Pak Med Assoc., 2008	Cross sectional survey	Jan-Feb 2007	Convenience sample, students in Karachi 572 students	
S7 Sontakke, Comparative study	Cross sectional survey	2011	339 students	
S 8 Husain et al, African journal of Pharmacy and Pharmacology, 2011	Cross sectional study multi centre in five cities of Pakistan	2011	Stratified sample of 2100 households	

**TABLE V: Continued**

Article/Survey	Study Design	Year	Sample characteristics	Knowledge/information
S 9 S. Kavalvizhi, IJEIMS	Descriptive study Questionnaire based	Sept-Nov 2010	Three institutions in South India-1189 students	64.2 % felt that the pharmacist played a major role in SM of non-prescribed meds over the counter. 80.82% learnt about medicines from previous prescription provided during prior illness. Friends, pharmacist, advertisements and books comprised the other sources.
S10 Girma Belecha Gutema, J of Applied Pharmaceutical Sciences, 2011	Descriptive cross sectional study	June 2011	307 students in Mekelle University	Self-decisions (64%) followed by family and friends (20%). Reading material (30.5%). Physicians and Pharmacists are most widely preferred sources of information for nonprescription medicines information
S 11 P.R.Shankar, Partha Shenoy, BMC Family Practice 2002	Semi structured Questionnaire in Nepal Rural and urban population	August 2001	142 respondents in Nepal.	Unavailability of precise information during the survey Compounders, traditional medicine practitioners and health assistants – sources of information regarding meds and other health protection measures.
S12 A.O.Afolabi, Annals of African Medicine, 2008	Cross sectional survey of women in Nigeria	2008	205 women, multistage sampling technique	Patent medicine dealers, (31.4%), medical practitioners and staff (20.6%) hospitals and pharmacies. Advertisement, family members and previous experience with the illness

S13 Al Motassem M.Youssef, Pharm World Sci,2008	Cross sectional observational study	December 2003- April 2004	800 customers	People tend to select medicines based on advice received from pharmacy staff, friends /neighbors, informal advice from doctors, nurses
S14 Henry James, Med Princ ,Pract, 2006	Questionnaire based descriptive study	November 2004	134 students, self-developed pre validated Q	Influence of knowledge on attitude towards self-medication- it makes them more careful. Knowledge about benefits and risks of SM was adequate.
S15 Wijesinghe R Pushpa, WHO South-East Asia Journal of Public Health, 2012	Community based cross sectional study	2012	1692 –sample size, rural and urban areas of Sri Lanka	Higher satisfaction with technical competence of pharmacy staff increased the likelihood of SM. In rural areas, respondents highly satisfied with affordability of medical services and concern for the clients were less likely to SM.
S 16 Self-med behavior in Pakistan	Cross sectional study	July 2007- January 2008	Stratified random sample of 1346 households in Pakistan	Drug sources are chemist shops, public health facilities, and GP's and lady health workers. Knowledge about medicines needs to increase through educational interventions.
S17 Balamurugan E, BJMP, 2011Self- med in South India	Cross sectional study	2009	200 participants- structured questionnaire	Major source through which respondents learnt to use SM is directly from pharmacist, (57.3%), prescription of previous illness (21.5%), television, friends and books.

**TABLE V: Continued**

<b>Article/Survey</b>	<b>Study Design</b>	<b>Year</b>	<b>Sample characteristics</b>	<b>Knowledge/information</b>
S18 Self-medication older people	Observational, Descriptive, Cross sectional study	2006	245 older adults, urban mexicans	ADR's (adverse drug reactions) were noted and attributed to the medicines the older people decided to take by themselves. 11% medicines were taken to self-medicate in hypertension. This could be because patients remembered their past prescriptions and decided to continue these without prescriber control.
S20 Sandeep A, Self-medication: Knowledge and practice among rural and urban population, 2013	Questionnaire based survey	2013	120 respondents	Identification of drug based on trade/generic names and color. Major sources of information were pharmacist, friends and advertisements. Majority of respondents were unaware of ADR (adverse drug reactions) and DDI (drug-drug interactions) and also did not know precautionary measures to be followed.
S 22 Akram Ahmad, Muhammad Umair Khan "Evaluation of knowledge, attitude and practice about self-medication among rural and urban north Indian population, ijpcr 2015	Community based cross-sectional study	2015	380 respondents	Level of awareness is significantly higher in urban population than rural population. Participants strongly agreed that long-term use of these drugs by self-medication could cause dependency.

on various aspects of drug safety and efficacy. There are already a number of positive changes initiated in this direction, for example GPP (Good Pharmacy Practices, FIP/WHO guidelines, 2011).

From the provider perspective, especially in a country like India, there are two major issues or challenges one can observe with respect to self-medication practices in the society. One is we do not have a specific OTC listing of drugs (Jain Pankaj, 2012) so in practice a lot of prescription drugs get used over-the-counter. In addition, there are diverse medicine systems in practice (Malvi Reetesh, 2011) and there is no mechanism to gather discrete information on self-medication across various medicine categories (freely available) being used by consumers. These are a larger set of issues and will need policy interventions from the government in the future.

Amidst this, self-medication practices can pose serious challenges if medicines either prescription or over-the-counter get misused, over used or underutilized. To ensure that the risks and benefits of medicine usage are known by consumers, we really need to look at and design interventions to promote healthy self-medication and in turn, rational drug use in the developing world.

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