OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences

Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) |ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com/sjmps

Original Research Article

Evaluation of Self-Medication Practice among Pharmacy Students in Roorkee (Northern India)

Chand Subhash[1, 2*], Singh Arjun[1], Kumar Deovrat[1] and Kumar Dharmender[2]

[1]College of Pharmacy, Roorkee, Uttarakhand Technical University, India
[2]Smt. Tarawati Institute of Biomedical and Allied Sciences, Roorkee, Uttarakhand Technical University, India

DOI: 10.36348/sjmps.2020.v06i03.004 | **Received:** 07.10.2019 | **Accepted:** 02.03.2020 | **Published:** 21.03.2020

***Corresponding author:** Subhash Chand, Assoc. Professor (Uttarakhand Technical University) subhashmpharma@gmail.com

Abstract

There are many potential harms associated with self-medication such as, toxicity, drug resistance, serious adverse effects, drug interactions, drug abuse and dependence, still it is being practiced widely for various reasons such as to save time & cost, to prevent symptoms or to treat minor illnesses, unavailability of doctors etc. The endeavor of this study was to describe and evaluate the self-medication practices, reasons behind self-medication & use of antibiotics without prescription among pharmacy students in northern India, using a structured questionnaire. The study was conducted in March 2015 with in 100 students from pharmacy field & related disciplines. Data concerning demographic characteristics, medication use habit, and self-medication were collected through a validated questionnaire with open and closed-ended questions. Medication knowledge was evaluated by the number of correct answers. Paracetamol & NSAIDs (89%) were found to be most frequently used OTC medicines for headache/ Fever. around 60% students consider self-medication for GI disease, 33% for skin disease & local injury, and 32% for ophthalmic ailments. Pharmacy students has significant knowledge about drugs. they were familiar about correct name, dose, associated side effects of drugs. Friends, Relatives and medicine retail shops are evaluated to be responsible for promoting self-medication among the pharmacy students. The presence of pharmacists in all medicine retail outlet can play a significant role to prevent self-medication harm. Immediate actions to promote healthcare under qualified Health Care Professionals should be considered by policy makers.

Keywords: Self-medication, Pharmacy Graduates, India, OTC drugs, Adverse Events, Healthcare, Irrational Drug Use.

INTRODUCTION

Self-medication is the medically unsolicited use of prescription and/or (OTC) Over-the Counter drugs. The practice is becoming a form of self-care [1] and is a global trend that is encouraged when it deals with minor illness. [2] Self-medication is not restricted to OTC drugs; it also encompasses use of prescription drugs like antibiotics particularly in countries where there are no strict regulations and prescription drugs are freely dispensed. [3] The employ of medications without any medical consultation may result in adverse drug reactions and drug toxicity. Self-medication, as it is called, is not only restricted to the use of over-the-counter (OTC) drugs, but it may also involve the use of prescription drugs. This practice is associated with an increased possibility of antibiotic resistance, polypharmacy, drug interactions and drug abuse. [4]

The responsible self-medication can be defined as the appropriate use of drugs to conditions for which they are approved & authorized as OTC.[5] The WHO since 1995, has stressed that rational self-medication helps in the prevention and treatment of minor pathological conditions at an affordable cost. However, the practice is not without undesirable and sometimes serious drawbacks such as the possibility of serious adverse effects, drug interactions, poly pharmacy, drug abuse and dependence.

The Need of OTC & Self Medication

There are numerous reasons for self-medication which include high cost of medical consultation, long hours of waiting at clinics, lack of time, social or family support, previous experience with the condition and its drug management, lack of nearby health facilities and unavailability of health professionals. It has been frequently reported that in different populations, university students use self-medication very often. [6]

Self-care behavior is not new, but rather the oldest and most widely used of all forms of behavior that affect the health of individuals. However, the use of the term in

the health field is new. The contemporary self-care is a response of developments and attitudes regarding the role of individuals that occurred over the past hundred years. the rapid changes in the healthcare organizations, content and delivery of formal health services also suggest another reason for maintaining the term self-care and developing associated theory and concepts. [6].

Attributes of Responsible Self Medication

For practice of responsible self-medication, a certain level of knowledge is required otherwise it can lead to incorrect or delay in diagnosis, increased resistance among pathogens and increase morbidity because of side effects and drug interaction. [7-9] Responsible self-medication requires medicines are of proven safety, quality & efficacy with OTC approval. Medicines are restricted for those indicated conditions that are self-recognizable and for some chronic or recurrent conditions.

Self-medication is not only prevalent in general population but is also common among the health care providers. Because they exposed to the knowledge of drugs, the pattern and incidence may however be different as compared to general population. [10,11] In one study in India, self-medication was reported among 92% of the medical students in contrast to 59% of the non-medical students.[4] A number of studies have been conducted to study the self-medication among various students but a very few on the pharmacy students. In India, the pattern of self-medication among pharmacy students in northern region of Uttarakhand state is remained unexplored. The present study is conducted to determine the pattern of self-medication practice among this population.

Health, Disease & Drug Use

According to WHO, health is defined as state of complete physical, mental, and social well-being and not merely the absence of Diseases or infirmity [13]. Patients understand their illness within their own conceptual framework, which includes their own beliefs, thoughts and feelings. They process that information and then make their own decision and act. Disease and illness are different. Illness happens to humans i.e.; illness is a subjective state of the person who feels aware of not being well. Disease happens to organs i.e.; disease is a physiological/psychological dysfunction. [12, 13]

Pharmacy graduates are the future pharmacists. Therefore, there knowledge attitude & practice towards self-medication is important to study because pharmacists are talking to patients about the drugs they dispense. The dialogue that occurs between the patient and health care provider often is telling and listening. Unfortunately, there is not a one-to-one correspondence between telling and knowing & knowing and doing. Patients take information and process it with their own cognitive framework, which is based upon their interpretation of their own experiences and henceforth start doing self-medication.[14]

Legal Issues in Self Medication

As per drug laws applicable to India, Self-Medication is permitted for OTC drugs but in India there is no specific list of OTC drugs, although essential drug list is famed by Indian Pharmacopoeia commission. The list of OTC drugs is obtained through exclusion method means, the drugs which are not in Schedule H or G will be evaluated for OTC based upon safety data. These medicines can be procured without the prescription of Registered Medical Practitioner and mainly used as self-medication. There are no "Pharmacist only" OTC medicines. Moreover, the situation is more complex as a number of prescriptions only medicines are used in self-medication and easily available through pharmacies with any prescription due to lack of active monitoring by health authorities.

SELF CARE CONCEPTS	SELF-MEDICATION	MAJOR DRAWBACK
Self-care has been defined as substitute, supplementary or additive to professional care, or as a discrete component in the health care delivery system. As there are many discipline & professionals concerned with health and self-care, there are also different definitions to self-care. However, all definitions agree on the main components/concepts of self-care: diagnosis, self-medication, self-treatment and/or patient participation in professional care. Self-care is active; it is participatory rather than passive receiving of care or directives given by professionals [10].	Self-medication is the treatment of common health problems with medicines specially designed and labeled for use without medical supervision and approved as safe and effective for such use. Medicines for self-medication are often called 'nonprescription' or 'over the counter' (OTC) and are available without a doctor's prescription through pharmacies. In some countries OTC products are also available in supermarkets and other outlets. Medicines that require a doctor's prescription are called prescription products (Rx products) [13].	Other than OTC, self-medication is unsolicited use of drugs. Scare of health information and education especially about medications and diseases implicate hazardous drawbacks to community in rural area. Worst yet, the lack of professional healthcare providers especially pharmacist's unavailability in these areas add up to the disadvantage. Even though self-medication is a useful tool to treat minor ailments but improper self-medication practice or medication abuse may lead to serious adverse drug reaction and possibly fatal consequences.

METHODOLOGY

The study was carried out prospectively between March to May 2015. The area of interest for this survey was "Self-medication practice among Pharmacy students in Roorkee of Dist. Haridwar" using a Sami-structured questionnaire. A total no. of 100 participants were interviewed. Data concerning demographic characteristics, medication use habit, and self-medication were collected though questionnaire with open and closed-ended questions. Prior to answering the questionnaire, the students were given a brief explanation about the intention of the study. The choice of question as well as the list of symptoms that might have been self-medicated were based on the findings of previous studies. OTC/ Self-Medication knowledge Attitude & practices of pharmacy graduates were evaluated.

Students in different years of pharmacy courses from various economic background, of both genders, willing to participate were included for questioner discussion. Each student was interviewed separately. Faculty members, other staff & those who were not enrolled in pharmacy courses or passed outs were excluded from study. MS Excel was employed for statistical consideration & data representation.

RESULT AND DISCUSSION

Studies to assess & evaluate Knowledge Attitude & Practice of drug use are needed not only for registered Healthcare Providers but also for the next generation/ upcoming drug professionals like pharmacy students. Patient health awareness programs and continuing pharmacy education programs are necessary for controlling self-medication. There is a needed for planning intervention to promote rational drug use through mass medias such as newspaper, magazine, TV, etc. Self-medication is one of the most modern ways of expression of the always present need of men and women for care of their health. Inappropriate self-medication results in irrational use of drugs, wastage of resources, and increased drug resistance, entails serious health hazards. This study was a questionnaire-based, descriptive study. A self-developed, pre-validated questionnaire consisting of both open-ended and close-ended questions was filled by pharmacy students.

The study was carried on the under graduate students (05%), post graduate students (09%), Ph.D. (04%) & other students (71%) enrolled different pharmacy programs at Uttarakhand technical university. Majority of study population was between 20-25 (70%) years of age. Majorly male student has taken parts (88%) as compared to only female students (12%). A significant no. of study participants was from rural (59%) background where clinic facilities are hindered & availability of qualified Healthcare personals is inadequate.

Table 1: Demographic Data

Characteristics	Total n=100)	% Freq.
Age		
>15 year	05	05
15 to 20	21	21
20 to 25	70	70
More then26	04	04
Gender		
Male	88	88
Female	12	12
Area of living		
Ruler	59	59
Aruban	38	38
Other	03	03
Education level		
*D. pharma	35	35
**B. pharma (UG)	59	59
***M. pharma (PG)	06	06

*Table 1: * Diploma in Pharmacy, ** Bachelors in Pharmacy (under graduation), Masters in Pharmacy (post-graduation)*

Generally, the prevalence of self-medication among all fields of medical science students is high, facilitated by the easy availability of drugs and information from textbooks or seniors. A significant number of students are unaware of the adverse effects of the medication that they themselves take and suggest to others. Therefore, potential problems of self-medication should be regularly discussed with these students.

Table 2: Self Medication Practice

Illness/Symptom of illness	Total (n=100)	% Freq.
*RTI	14	14
**GI disease	60	60
***STDs	05	05
Eye disease	32	32
Headache/fever	89	89
Skin disease/injury	33	33
Other	02	02
Requested category of drugs for self-medication		
Antibiotic/Antimicrobial	24	24
Analgesic/Antipyretic	50	50
Respiratory drugs	06	06
GI drugs	17	17
Vitamins	10	10
****ORS	02	02
Purchase drugs without prescription in last 3 month		
Once	40	40
Twice	47	47
Thrice	07	07
Four or more	06	06
Average OTC Drug expenditure in last 3 month		
Less than 100	20	20
100 to 200	59	59
200 to 300	11	11
More than 300	10	10

*Table 2: *Respiratory Tract Infection, **Sexually Transmitted disease, ***Gastrointestinal, ****Oral Rehydration Salt*

Minor ailments are self-treatable and do not require clinical interventions such as small injuries, headaches, general fever, common cold & coughs etc. even it is well known fact that if not taken any drug for these ailments, & if they are not serious and without underlying medical condition than our immunity could heal these symptoms with due course of time. Our ancestors have encountered these symptoms and has always suggested us all to utilize homemade remedies to combat minor symptoms & diseases. These are not only cheap, easy, affordable but also harmless as compared to the risk of toxicity & adverse events as seen in self-medication practice of pharmaceutical products.

Our study has identified that the pharmacy students used self-medication for Respiratory Tract Infection (14%), Gastrointestinal disease (60%), Sexually Transmitted Diseases (05%), for eye (ophthalmic) diseases (32%), headache/fever (89%), skin (dermatological) diseases (33%) and for other (02%). Here maximum no. of self-medication is associated with the headaches & fevers which are minor in nature, if underlying medical condition is absent. There is a high frequency of symptoms/ illness (such as Symptoms/ illness of GI> dermatology> Ophthalmic>RTI followed by STDs), of which treatment without monitoring of healthcare provider could be harmful to patients.

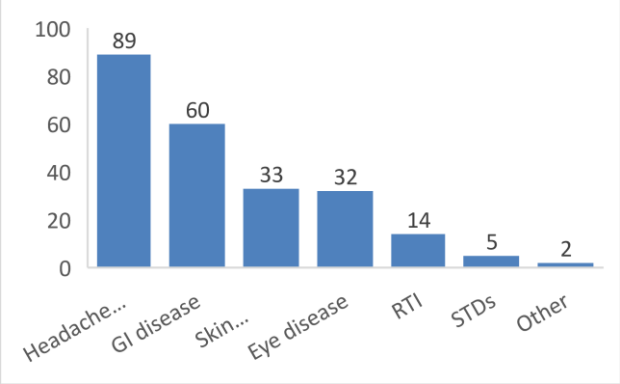

Figure 1: Illness/Symptom of illness for which Self Medication is Practiced among Pharmacy Students

A study by Tanveer A. Khan; et al. 2014 [15] conducted on students from tribal background, involved in self-medication were restricted to use only one or two drugs. Most common drug was paracetamol. Main advantage mentioned was quick relief and no disadvantage. Students were searching for quick relief, time and money benefit but unaware of its serious consequences. There is urgent need to change such attitude.

In our study the category of the drug frequently used was Antimicrobials/Antibiotic, analgesics/antipyretics drugs, respiratory drugs, GI drugs, vitamins & ORS with 24%, 50%, 06%, 17%, 10% & 02% frequency respectively. Analgesics & antipyretic agents are commonly the most utilized OTC class of drugs which is normal, but a high frequency of drugs targeting respiratory & gastrointestinal tract with considerable antibiotics involved is something which is needed to be focused by health authorities to prevent drug resistance in general population.

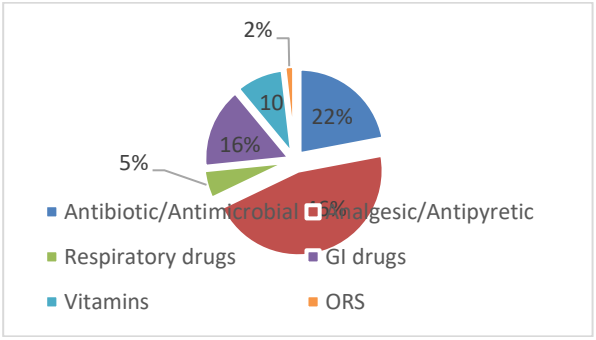

Figure 2: Requested category of drugs for self-medication

In India the average daily wage of a labor is around Rs 200-300, the same is the average consultation fee which is charged by a physician for advising treatment plan. This high fees & lack of doctors with excessive patients load on government hospitals make a lay man to sought treatment either from sub-qualified quakes or better self-medication with advice from various sources.

In our study we identified that the average expenditure of the actual drug user students since last 3 months was Rs 20 - 100 (20%), having Rs- 100-200 (59%), having Rs- 200-300(11%) and more then Rs- 300(10%). It clearly shows that a good amount of pocket money is being expended upon self-medication by pharmacy students. This data reveals that significant no. of pharmacy graduates are considering self-medication thereby choosing OTC drugs for self-management of symptoms rather than visiting a physician for checkup & obtaining prescription or treatment plan. This practice should be focused by lawmakers.

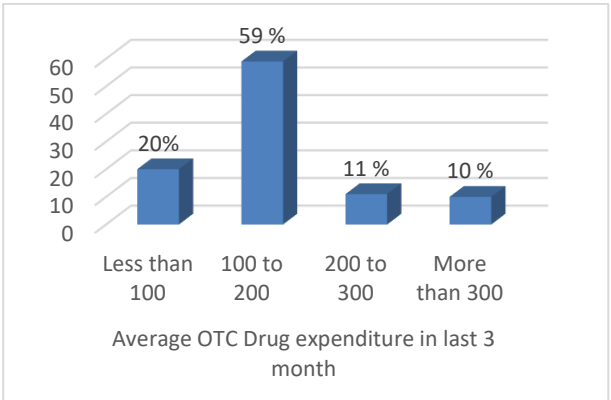

Figure 3: Average OTC expenditure (in Rs) in last 3 month

Table 3: Drug Information Knowledge Attitude & Practice

Types of request for drugs by consumers	Actual drug user (n=100)	% Freq.
By mentioning the name of the drugs	63	63
Telling the symptom of the illness	25	25
Showing an old sample/package of the drug	08	08
Presenting piece of paper	04	04
Other	02	02
Source of information/advice		
Received no information	11	11
Read information materials	08	08
Advised by friends, family and Neighbours	15	15
Advised by doctors, Pharmacist, Nurses & other health works without prescription	72	72
Other	03	03
Type of drug information sought before requested		
Correct name of drug	90	90
Indication	55	55
Dose, Frequency and duration	65	65
Side effect, contraindication or precaution	20	20
Storage of drug at home	78	78
Dosage forms preferences		
Tablet	71	71
Capsule	33	33
Injection	05	05
Liquid preparation	22	22
Other	03	03
Drug storage place at home		
Out of the reach of children	92	92
All drugs in the refrigerator	14	14
All drugs in the kitchen/bathroom	04	04
All drugs in one place but separated	81	81
Knowledge or different parameters of drugs		
Not taking drugs with alcohol	17	17
No sharing of drugs	32	32
Checking of expiry dates before taking	87	87

Girma Belachew Gutema; et al; 2011 [16] evaluated that the main source of practicing self-medication were Self-decisions 41(64.00%) followed by family/friends 20(31.65%) whereas we have identified that the source of drug used were self-medication, read label, leaflet or promotional material, friends, previous advice of the health care providers such as physicians, Pharmacist, nurses and health assistants but without formal prescription.

we have assessed that the majority of drug users sought self-medication within 24 hours duration of illnesses/symptoms of illnesses (70%), followed by 1-7 days as 06%, 5-12 weeks were only 04%. Although these medications are considered risk free and useful for the treatment of common health problems, their excessive use can also lead to serious side effects and unfavorable reactions. There are several drug stores, which provide the medicine without any prescription and their percentage is increasing day by day in India due lack of strict healthcare rules & regulations from competent authorities. acquiring medicines without an authorized prescription, resubmitting old prescriptions to purchase medicines, sharing medicines with relatives or members of one's social circle or using leftover medicines stored at home is an ill practice.

Now a day's people are keen to accept more personal responsibility for their health status and to obtain as much sound information as possible from expert sources in order to help them make appropriate decisions in health care. Governments and health insurers are increasingly encouraging self-care, including self- medication when appropriate, but this should not skip regular health checkups & consultation from registered healthcare personals.

We have evaluated that pharmacy students who opt for OTC drugs, make request to drugs store keepers by mentioning the name of the drugs were 63%, Telling the symptom of the illness were 25%, Showing an old sample/package of the drug were 08% & Presenting piece of paper were only 04%. As pharmacy background students have considerable amount of knowledge about drugs, therefore these results are not surprising.

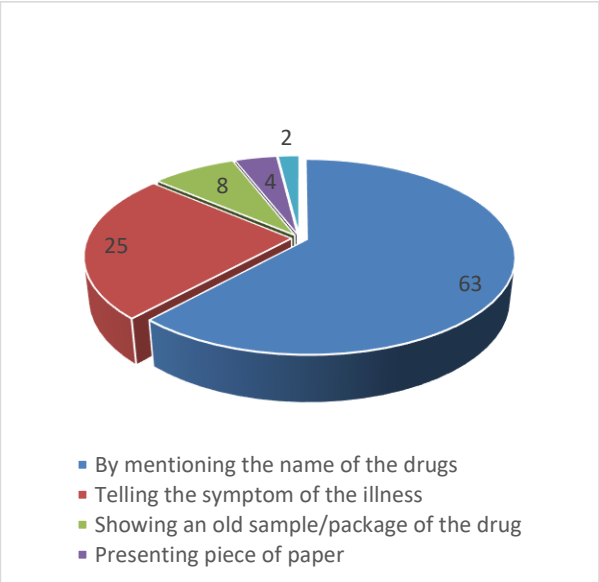

Figure 4: Types of request made by consumers while considering self-medication from drug store.

Tablets are the most common dosage form which is being consumed across the globe. These are economic, easily available & their shelf life is also better than others along with their transportation & storage. The same preference is evident in our study as majority of students (71%) have preferred to take drugs in the form of tablets followed by capsules (33%), liquid preparation (22%) & only very few (05%) preferred to take injection as they are invasive in nature.

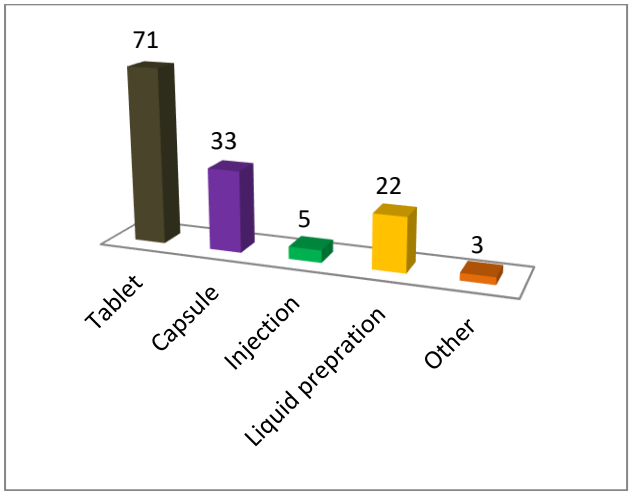

Figure 5: Dosage Forms preference for the Self Medication

The user should possess information of how to take the drug, when to take, how long to take, its possible side effects, drug-interactions and when to consult the doctor. Patients take information and process it with their own cognitive framework, which is based upon their interpretation of their own experiences and henceforth start doing self-medication. In our study, almost every student (90%) has agreed that they sought drug correct name (generic/ or brand) followed by indication & dose as well but only 20% of them have enquired about side effects & adverse events.

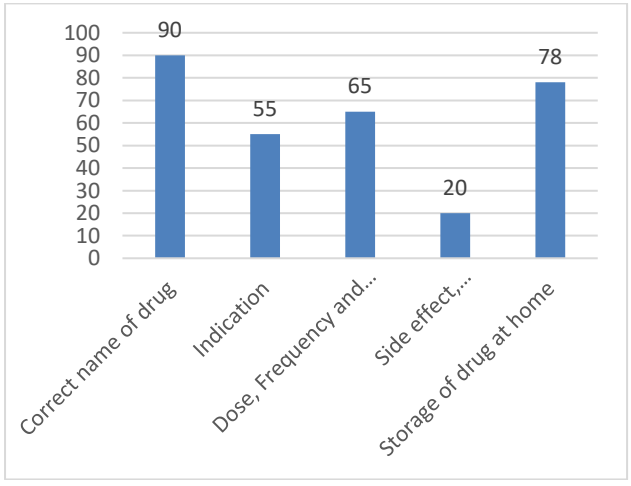

Figure 6: Type of drug information sought prior to self-medication.

In this study 87 % students have mentioned that they check expiry date of drugs prior their use, which is a good sign and also expected as the students are from pharmacy background therefore must be aware about harms associated with the use of expired drugs. Around 92 % of students has ensured that the medicine that they or their family members uses should be stored out of the reach of children. These shows that pharmacy students possess a good knowledge about the indications, contraindications & storage information of drugs. The prevalence of self-medication among pharmacy students is high, facilitated by the easy availability of drugs and information from textbooks or seniors. A significant number of students were unaware of the various parameters of drug use such as antagonism & synergism that they themselves take and suggest to others.

The positive demand towards pharmaceutical products for self-medication raises ethical issues of medication abuse. However, literature also concluded that most adults are capable in distinguishing major and minor complaints, for which doctors' consultation is needed or not and when responsible self-medication would be sufficed. This showed patents willingness to be more responsible for their health issues. Patient behavior with research evidences supports this matter. Especially, medical & pharmacy students know the limitation and when to self-mediate, precautionary steps and when to seek for professional assistance. [17]

OTC pharmaceutical products should be supported by information, which describes: [18]

- How to take or use the medicines.
- Effects and possible side-effects.
- How the effects of the medicine should be monitored.
- Possible interactions.
- Precautions and warning.
- Duration of use; and,
- When to seek professional advice.

Main reasons for self-medication were non-serious health problem, illness is minor, seeking quick relief and to avoid long waiting hours at clinic. Reasons against self-medication include risks of adverse effects, using the wrong medication, drug interaction, misdiagnosis and drug abuse and dependence. Headache or mild pain, eye and ear symptoms, gastric problems, cold, fever and allergy are the commonest symptoms for self-medication. Scare of health information and education especially about medications and diseases implicate hazardous drawbacks to community in rural area. Worst yet, the lack of professional healthcare providers especially pharmacist unavailability in these areas add up to the disadvantage. Even though self-medication is a useful tool to treat

minor ailments but improper self-medication practice or medication abuse may lead to serious adverse drug reaction and possibly fatal consequences. [19]

CONCLUSION

The questioner we employed to asses self-medication was useful to evaluate the pattern of medication uses and the level of medication knowledge. Pharmacy students were found to be using self-medication in the form of OTC including antimicrobial agents along with Non-Steroidal Anti-Inflammatory Drugs such as paracetamol. Lack of qualified pharmacists increase the risk factor for self-medication. Headache/fever, GI disease and RTI were the three major reasons for self-mediation. Friends, Relatives and medicine retail shops responsible for promoting self-medication among the pharmacy students. The presence of pharmacists in all medicine retail outlets can play a significant role in controlling some of the factors that promote the self-medication among the pharmacy student.

In, summary, the fact that being a healthcare student is associated with higher medication knowledge, but not with less self-medication, suggests that medication knowledge might contribute to increase self-medication practice as evident in HCPs case. This should be taken into account when designing educational interventions relating to self-medication. Our study has supported that self-medication is highly prevalent among pharmacy students at the Roorkee, Northern India region. The appraisal of self-medication is important for studying proper drug use. In this study, pharmacy student awareness of several facts about self-medication seems appropriate; however, more effort to endorse responsible self-medication are needed. In addition, strict policies from health authorities should be regulated to forbid the provision of medicines without a valid prescription. OTC regulations should be re-assessed for proper use with pharmacist counselling.

CONTRIBUTION

SC & DHK have developed the study protocols and collected data. AS has analyzed the questioner data & prepared the manuscript. DEK has provided the resources. All authors have contributed potentially.

ACKNOWLEDGMENT

We acknowledge Uttarakhand Technical University, Dehradun and Pharmacy Council of India, New Delhi for motivation to conduct research & promote pharmacy education the country.

CONFLICT OF INTREST

We declare no conflict of Interest of any kind with anybody.

ABBREVIATIONS

GI: Gastro-Intestinal

NSAIDs: Non-Steroidal Anti-Inflammatory Drugs

ORS: Oral Rehydration Salt

OTC: Over the Counter

RTI: Respiratory Tract Infection

TV: Television

WHO: World Health Organization

REFERENCE

1. Hughes, C. M., Mc Elnay, J. C., & Fleming, G. F. (2001). Benefits and risks of self-medication. *Drug safety*, *24*(14), 1027-1037.
2. Porteous, T., Bond, C., Hannaford, P., & Sinclair, H. (2005). How and why are non-prescription analgesics used in Scotland? *Family Practice*, *22*(1), 78-85.
3. Sarahroodi, S., Arzi, A., Sawalha, A. F., & Ashtarinezhad, A. (2010). Antibiotics self-medication among southern Iranian university students. *Int J Pharmacol*, *6*(1), 48-52.
4. Shah, A. K., Rathore, R. S., Datir, N. P., & Mail, I. D. (2015). Assessment of self-medication among dental students: An institution-based survey in a dental college at Vadodara, Gujarat. *Health*, *3*(3).
5. Kilwein, J.H. (1989). The Pharmacist and public health P.389 in: Albert I. Wertheimer, Mickey C. Smith, editors. Pharmacy Practice, Social and Behavioural Aspects, third edition 1989, Williams and Wilkins publishing, USA.
6. Lau, J. T., Yu, A., Cheung, J. C., & Leung, S. S. (2000). Studies on common illnesses and medical care utilization patterns of adolescents in Hong Kong. *Journal of adolescent health*, *27*(6), 443-452.
7. Betsy, S. (2001). Physician-Patient Communication about Over-the-Counter medicines. *Soc. Sci. Med*, *53*(3), 357-369.
8. Andualem, T. (2002). *A prospective study on self-medication practices and consumers drug knowledge in Addis Ababa* (Doctoral dissertation, Addis Ababa University).
9. James H, Handu SS, Al Khaja KAJ, Sequeira RP. Evaluation of the knowledge, attitude and practice of self-medication among first year medical students. Med Princ Pract 2006; 15: 270–275.
10. Bennadi, Darshana. "Self-medication: A current challenge." *Journal of basic and clinical pharmacy* 5.1 (2013): 19.
11. Bell, John, et al. "Self-care in the twenty first century: a vital role for the pharmacist." *Advances in therapy* 33.10 (2016): 1691-1703.
12. Shiferaw, M. and Fanta, H. *Epidemiology, a Manual for Health Workers and Students in*

Ethiopia, Published by Health Learning Materials Development and Production Division, Ministry of Health, Ethiopia, 1990.

13. World Health Organization. The Role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist, The Hague, The Netherlands, 26-28 August 1998. No. *WHO/DAP/98.13. World Health Organization*, 1998.
14. Kilwein, J.H. The Pharmacist and public health P.389 in: Albert I. Wertheimer, Mickey C. Smith, editors. *Pharmacy Practice, Social and Behavioral Aspects*, third edition 1989, Williams and Wilkins publishing, USA.
15. Hegde R, Gomes AR, Giridhar P, Kowalli S, Shivashankar BP, Sudharshana KJ, Nagaraj K, Sesharao R, Mallinath KC, Shankar BP, Nagaraj D. Epidemiology of foot and mouth disease in Karnataka state, India: a retrospective study. *Virusdisease*. 2014 Dec 1;25(4):504-9.
16. Gutema GB, Gadisa DA, Kidanemariam ZA, Berhe DF, Berhe AH, Hadera MG, Hailu GS, Abrha NG. Self-medication practices among health sciences students: the case of Mekelle University. *Journal of Applied Pharmaceutical Science*. 2011 Dec 1;1(10):183.
17. World Health Organization/*Drug Action Program*., 1988
18. World Health Organization (WHO). Contribution to updating the WHO Guideline for Developing National Drug Policies. *Report of a WHO Expert committee meeting*, 19-24 June 1995.
19. The International Pharmaceutical Federation and World Self-medication Industry (FIP/WSMI). Responsible self-medication, 2002.