

Research Article

An investigation on the consumption of over-the-counter medication among the population in Tirupati city

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ABSTRACT

Background: Non-prescription drugs/over the counter (OTC) drugs refer to all the drugs that can be legally purchased without requiring a prescription from a registered medical practitioner. The objectives of this study were to assess the sales of OTC drugs within pharmacies, to know the most widely consumed class of OTC drugs from pharmacies and to assess the awareness of the customers in asking about drug interactions while consuming OTC drugs in pharmacies.

Methods: A cross-sectional study was conducted among pharmacies. The study period for data collection was 1 month, and for data analysis, 15 days were required. 50 pharmacies were randomly selected as the sample size. The questionnaire consists of 8 questions from which the most consumable class of drugs sold, and also during COVID-19 were identified.

Results: Out of 50 pharmacies, 48% that is in 24 pharmacies the mostly sold class of OTC are drugs used for cold and cough / anti-histamines, 22% that is in 11 pharmacies the mostly sold class of OTC drugs are anti-pyretics / analgesics / anti-inflammatory compounds. In 2 pharmacies OTC drugs are mostly sold in summer season, in 24 pharmacies OTC drugs are mostly sold in winter season, in 4 pharmacies OTC drugs are mostly sold in monsoon season and in 20 pharmacies the OTC drugs are sold without any seasonal variation.

Conclusions: The over the counter medication consumption was found to be high in Tirupati city because most of the results obtained in this study show similarity to the related studies. The most commonly sold drug among 50 pharmacies was drugs used for cold and cough /anti histamines and the sales of OTC drugs is also high in pharmacies of Tirupati.

Keywords: Over the counter drugs, Pharmacies, awareness, drug interactions, adverse events

INTRODUCTION

Non-prescription drugs / OTC drugs refer to all the drugs that can be legally purchased without requiring a prescription from a registered medical practitioner.¹ Self-medication refers to individually recognizing their symptoms, making self-diagnosis and choosing and using medications by themselves. In this scenario, the medications used by the people are over the counter drugs.² In general, over the counter drugs are used to treat conditions those that do not require direct medical attention. Now a days consumption of OTC drugs has been increased because of so many indications that is, people are literates and they take their own decisions for their illnesses. They take their own decisions by means of social network, internet, previous prescriptions, family suggestions etc. The common reasons for selection of OTC drugs for medication are, they are cost effective, easily available, reduce visits to physician, self-management of minor ailments. But the

problem from them are, more exposure to OTC drugs lead to several risks such as incorrect diagnosis, over dosing/under dosing of drugs, masking of signs and symptoms of underlying major illness, delay in seeking medical care, adverse drug reactions, interactions with other concurrently used medications/food, drug dependence to certain drugs, anti-microbial resistance.³ As over the counter drugs usage is increasing nowadays because of so many reasons noted above, and also the pharmacists play a major role in giving assistance and advice about over the counter drugs to the population. In this study we will get the results of most consumable class of drugs and also probably the results of usage based on age and gender also, so that based on these results the population knows the present consumption of OTC drugs in the study site and use them accordingly. And also, the pharmacists tell about the drug interactions and adverse effects correctly to the customers while consuming the

drugs, so that the morbidity and risks caused by OTC drugs in Tirupati can be decreased to some extent.

We have taken this study because this type of study has not done in recent past on over the counter drugs in the study site Tirupati. And the studies which are done also didn't include this kind of information as we have taken from the pharmacies about the consumption of OTC drugs.

In this study, the infrastructural facilities were the pharmacies in which the study was carried out. If it is a remote village without the pharmacies, then doing this study in such places is not possible and the presence of qualified pharmacists is also a facility because without them the study might become difficult. Presence of pharmacies selling over the counter drugs is also one of the materials because if no pharmacies sell over the counter drugs in that specific study site it is not possible to do this study and to collect data in such sites. The proposed outcome was the assessment of OTC drug sales among the pharmacies. With this background the objectives of this study were to assess the sales of over-the-counter drugs within pharmacies, to know the most widely consumed class of over-the-counter drugs from pharmacies and to assess the awareness of the customers in asking about drug interactions while consuming over-the-counter drugs in pharmacies

MATERIAL AND METHODS

A cross-sectional study was conducted among pharmacies. Study period for data collection was 1 month and data analysis was 15 days from the date of approval from ethics

committee. Qualified pharmacists in pharmacies in Tirupati who have given written informed consent were included in the study and non-cooperative pharmacists in pharmacies and pharmacists who refused to give informed consent in pharmacies in Tirupati were excluded.

Sample size: In Tirupati, there are approximately 200 pharmacies, and based on the availability and also over the counter drugs are mostly sold in the pharmacies nearby houses for this study, took about 50 pharmacies was taken randomly as sample size.

Study procedure: Investigating the pharmacist in the pharmacy with the help of a questionnaire. The questionnaire consists of 8 questions from that we can know the most consumable class of drugs sold, and also during COVID-19, and also the consumption difference based on the gender and age, and the most widely used dosage forms of consumption of OTC drugs, and about the drug interactions and adverse effects and also the variation based on seasons. We have given this questionnaire to the pharmacists to fill it. By this, we got the results about the consumption of OTC drugs in population.

Data analysis was done by entering the data into Microsoft excel. Before collecting data, all subjects were briefed about the purpose of study and written informed consent was obtained. Subjects were given the right to withdraw consent at any stage of the study. Ethics committee had given clearance certificate for this study.

RESULTS

Table 1: Distribution according to Non-prescription drugs are mostly sold

	Variable	Frequency	Percentage
Which non-prescription drugs are mostly sold from your shop?	Drugs for cold and cough/antihistaminic	24	48
	Antipyretics/analgesics/anti-inflammatory	11	22
	Drugs for peptic ulcer/antacids/digestives	6	12
	Supplemental therapy (Multivitamins, iron and calcium supplements)	5	10
	Anti diarrhoeal drugs	2	4
	Anti microbials	1	2
	Steroid preparations	1	2
Which non-prescription drugs are mostly sold during COVID- 19?	Antipyretics/analgesics/anti-inflammatory	22	44
	Drugs for cold and cough/antihistaminic	14	28
	Supplemental therapy (Multivitamins, iron and calcium supplements)	5	10
	Drugs for peptic ulcer/antacids/digestives	4	8
	Anti microbials	3	6
	Others	2	4

Out of 50 pharmacies, 48% that is in 24 pharmacies the mostly sold class of over the counter drugs are drugs used for cold and cough/anti histamines, 22% that is in 11 pharmacies the mostly sold class of over the counter drugs are anti pyretics /analgesics/anti inflammatory, 12% that is in 6 pharmacies the mostly sold class of over the counter drugs are drugs for peptic ulcer/ antacids/digestives and 10% that is in 5 pharmacies the mostly sold class of over the counter drugs are drugs used for supplemental therapy and some drugs like anti diarrhoeal, steroid preparations, anti-microbials are less frequently sold. 44% that is in 22 pharmacies the mostly sold class of OTC drugs during COVID-19 period are

antipyretics/analgesics/anti-inflammatory drugs. 28% that is in 14 pharmacies the mostly sold class of OTC drugs during COVID-19 period are drugs for cold and cough /anti histamines. 10% that is in 5 pharmacies the mostly sold class of OTC drugs during COVID-19 period are drugs used for supplemental therapy. 8% that is in 4 pharmacies the mostly sold class of OTC drugs during COVID-19 period are drugs used for peptic ulcer /antacids/digestives. 6% that is in 3 pharmacies the mostly sold class of OTC drugs during COVID-19 period are antimicrobials. 4% that is in 2 pharmacies other types of OTC drugs are sold during COVID- 19 period.

Table 2: Distribution of over the counter drugs according to sociodemographic factors, seasons, form, drug interactions and adverse events

Variable		Frequency	Percentage
Which gender people are highly consuming over the counter drugs?	No difference	26	52
	Male	17	34
	Female	7	14
Age variation in consumption of over-the-counter drugs	<20 years	2	4
	20-60 years	43	86
	>60 years	5	10
Seasonal variation	Summer	2	10
	Winter	24	48
	Monsoon	4	8
	No difference	20	40
In which form the non-prescription drugs are mostly sold?	Tablets	40	80
	Ointments	6	12
	Drops	2	4
	Syrups	2	4
people asking about drug interactions over the counter drugs in pharmacies	0-25%	14	28
	25-50%	7	14
	50-75%	17	34
	75-100%	12	24
Customers complaining about adverse drug reactions regarding non-prescription drugs?	0-25%	49	98
	25-50%	1	2

Out of 50 pharmacies, in 26 pharmacies that is 52% the OTC drugs are consumed by both males and females at no difference rate. In 17 pharmacies that is 34% the OTC drugs are mostly consumed by males. In 7 pharmacies that is 14% the OTC drugs are mostly consumed by females. The age group which is mostly consuming over the counter drugs is 20-60 years age with 86% response that is in 43 pharmacies, in 5 pharmacies that is 10% the mostly consuming age group is greater than 60 years people, in 2 pharmacies that is 4% the mostly consuming age group is lesser than 20 years people.

80% that is in 40 pharmacies over the counter drugs are sold in tablets form, 12% that is in 6 pharmacies over the drugs are sold in ointments form, 4% that is in 2 pharmacies over the counter drugs are sold in the form of drops and 4% that is in 2 pharmacies over the counter drugs are sold in the form of syrups. In 98% of pharmacies, 0-25% of customers complained about adverse drug reactions after using over the counter drugs and in 2% of pharmacies, 25-50% of customers complained about adverse drug reactions after using over the counter drugs

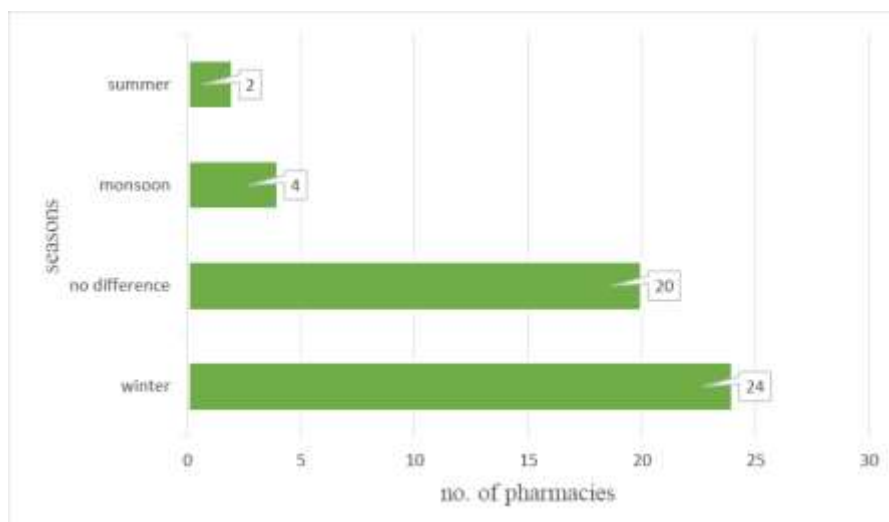


Figure 1: Seasonal variation in sales of over the counter drugs

In 2 pharmacies, OTC drugs are mostly sold in summer season, in 24 pharmacies OTC drugs are mostly sold in winter season, in 4

pharmacies OTC drugs are mostly sold in monsoon season and in 20 pharmacies the OTC drugs are sold without any seasonal variation.

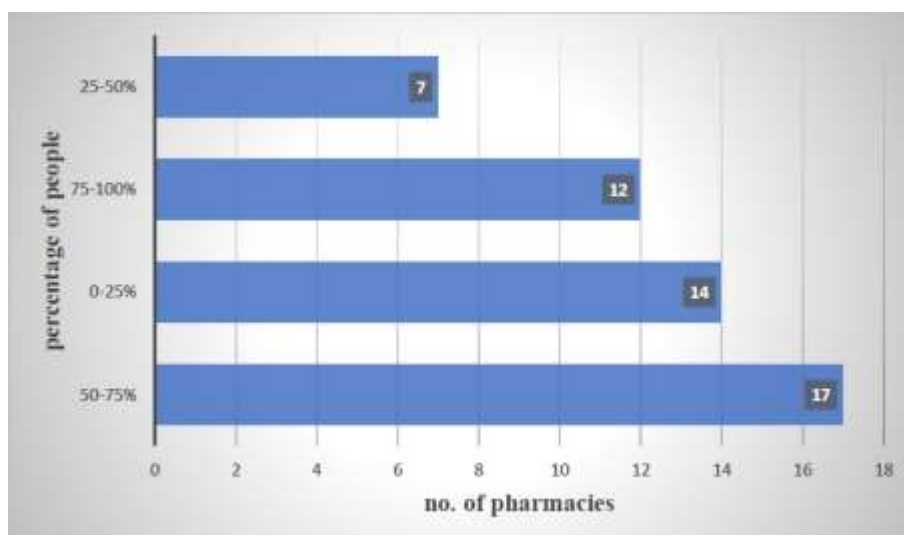


Figure 2: Percent of people asking about drug interactions about over the counter drugs

In 14 pharmacies, 0-25% of customers asked for drug interactions, in 7 pharmacies 25-50% of customers asked for drug interactions, in 17 pharmacies, 50-75% of customers asked for drug interactions and 12 pharmacies, 75-100% of customers asked for drug interactions.

DISCUSSION

In this study, the assessment of over-the-counter drugs in the pharmacies was conducted by selecting 50 pharmacies. From the results of the study the most commonly sold OTC drugs from the pharmacies were drugs for cold and cough or anti-histamines (48%) (n=24). Followed by anti-pyretic or analgesics or anti-

inflammatory (22%) (n= 11), drugs used for peptic ulcers or antacids or digestives (12%) (n= 6), drugs used for supplementary therapy like multivitamins, iron supplements, calcium supplements etc. (10%) (n= 5) and anti-diarrhoeal drugs (4%) (n= 2) Anti microbials (2%) (n= 1) steroid preparations (2%) (n= 1). In a study conducted by Shah H et al they found that the commonly used drugs for self-medication was antipyretics (83.06%) followed by non-steroidal anti-inflammatory drugs (64.48%), cough syrup (48.09%) antihistamines (47.54%) and antacids (43.17%) skin ointment (33.88%) antiemetics (31.69%) anti-diarrhoeal (28.96%) eye or ear drops

(20.22%) antispasmodics (18.58%) nutritional supplements (17.49%) and others (2.19%) they have done this study among under graduate medical students in Gujarat.⁴ In the study done by Kanad Deepak et al they found that analgesics and antipyretics were the most common class of drugs used for self-medication by majority of participants 99% and 97 % respectively then followed by cough and cold preparations (73%) they have done the study to know the knowledge attitude and practices of over the counter drugs medicine among urban population.⁵ In a study done by Panda A et al they found that overall prevalence rate of over the counter medication use was (18.72%) and the most common indications for over the counter medications usage was fever (22.42%) followed by pain (15.75%), and gastrointestinal symptoms (15.75%) and the most commonly used over the counter medication were non-steroidal anti-inflammatory drugs (38%) followed by gastrointestinal drugs (16%) followed by cough remedies (14%) and anti-microbials (10%)[13].⁶ In a study done by Sánchez-Sánchez E et al they found that the mostly consumed over the counter drugs were analgesics in their study.⁷

In a study done by Nagaraj.M et al the most commonly dispensed drugs were analgesics (26.8%) other categories dispensed were antihistamines (15.2%), antacids (14.8%), antibiotics (10%), antipyretics (7.8%), Oral contraceptive (OC pills) (5.09%) and others (20%)[9].⁸ In a study done by Shrotri et al the most common over the counter drugs sold were analgesics 56.7 (72), antibiotics 15.8 (20), antihistamines 8.6(11), tranquilizers 5.6(7), Antipyretics 4.7(6), Herbal medicines 3.9(5), vitamins 2.3(3), others 2.3(3).⁹ There is a slight variation from the previous studies results in almost all the studies show that the mostly consumed over the counter drugs were either antipyretics, analgesics or antibiotic drugs this variation from this study is because as the data collection in this study is taken in October month which is a rainy season so most of the population in the City would be suffering from cold and cough because of the climate so the mostly consumed drugs from the pharmacies would be the drugs for cold and cough and anti-histamines this is one of the limitation of this study. Antihistamines or cold and cough drugs are mostly used to treat the conditions like common cold.

The mostly sold class of over the counter drugs during COVID 19 was anti pyretics/analgesics/anti-inflammatory drugs

(44%)(n= 22) followed by drugs used for cold and cough /anti histamines (28%)(n= 14), drugs used for supplemental therapy (10%)(n= 5), drugs used for peptic ulcer /antacids /digestives (8%)(n=4), anti-microbials (6%)(n= 3), other drugs (4%)(n= 2) which are not included in options. In a study done by Yasmin F et al they got the results as the most commonly utilized medications were Paracetamol (65.2%), multivitamins (56.0%), Ibuprofen (29.0%), Cetirizine (27.8%), and Azithromycin (25.6%) during COVID 19.¹⁰ In a study done by Elayeh E et al they got the results as Paracetamol was the main product used to treat symptoms such as fever, muscle pain, and sore throat (36.0%, n = 424), followed by cold and /or cough preparations or mucolytics (21.1% n = 249), antiseptic lozenges, (17.2%, n = 203), antihistamines (13.9%, n = 164) and ibuprofen (13.4%, n = 158). Vitamin C (20.7%, n = 244% vs 17.6%, n = 208) and zinc (15.8%, n = 186% vs 15.4%, n = 181) were the most commonly used products to prevent and treat COVID-19 infection, respectively. That is, vitamin c and zinc come under supplemental therapy they are used during COVID 19 to build immunity.¹¹ There is no specific variation from the previous studies about the mostly sold over the counter drugs during COVID-19. Most of the studies said it is anti-pyretics and analgesics that are mostly over the counter drugs sold during COVID-19. In this study which was conducted in Tirupati the same results were obtained. Antipyretics were used during COVID-19 period either to relieve common symptoms of cold and fever or to treat COVID infection. The OTC drugs are mostly consumed by both males and females in no difference rate (52%)(n= 26) that is males and females are consuming the OTC drugs equally from the pharmacies in Tirupati then followed by only males (34%)(n= 17) and only females (14%)(n=7). In a study conducted by Wazaify M et al, they noted that there was no difference in terms of gender with regard to non-prescription medicines purchase ($p>0.05$).¹² In a study conducted by Verma S et al they gave results as male customers (87%) in that part of the country are more prone to purchase and use over the counter health supplements in comparison to female customers (13%).¹³ In a study done by Balamurugan E et al they gave results based on gender as females (78/112) are most likely to use self-medication in comparison to males (43/88) with a ($p<0.05$).¹⁴ In a study conducted by Hyun Jeong Kim et al they gave results as females 117(52.2%) are

consuming more over the counter drugs than males 107(47.8) in a population who are suffering with chronic disorders.¹⁵ In a study conducted in Panda A et al they gave results as males 124(24.2%) were more likely to use over the counter medications.⁶ In a study done by Sánchez-Sánchez E et al they gave results in terms of gender as females consumed more analgesics and cough medicines than men and the remaining over the counter drugs were mostly consumed by males.⁷ In a study done by Nagaraj.M et al based on gender the results were, males (70.83%) were mostly consumed drugs without prescription.⁸ In a study done by Shrotri et al based on gender the results was, females 56.3(9) were consuming more over the counter drugs than males 43.7(7).⁹

Over the counter drugs are highly consumed by age group between 20-60 years (n=43) (86%) then followed by age group greater than 60 years (n=5) (10%) and then age group lesser than 20 years (n=2) (4%). In a study conducted by Verma S et al they gave results as 41-50 years age group people are the major buyers of health supplements in eastern India.¹³ In a study conducted by panda A et al they found that people under 45 years of age group people are highly consuming over the counter drugs.⁶ In a study conducted by Hyun Jeong Kim et al they found that <65 years age group people 149 (66.5%) are consuming more over the counter drugs medication.¹⁵ In a study done by Sánchez-Sánchez E et al they gave results based on age as young people (25 years of age) consumed more analgesics with consumption of anti-histamines, gastroprotection, and other drugs increasing with age.⁷ In a study conducted by Kishore et al they gave results as (85.5%) respondents in their study belong to age group 21-40 that is followed by age group of below 20 years that is (11.2%) and age group of 41- 60 that is (2.6%)[23].¹⁶ In a study conducted by Nagaraj. M et al., based on age the results were, the adult's group (84.25) of people mostly consumed over the counter drugs followed by elderly age group (12%), paediatrics (2.30%), adolescents (1.30%).⁸ In a study conducted by Shrotri et al., based on age the mean age of 37.4 years age group people are consuming more over the counter drugs.⁹

The OTC drugs are mostly sold from the pharmacies in winter (n=24) (48%) followed by no difference rate based on seasons 40%, then monsoon (n=4) (8%) and then summer (n=2) (4%). In a study done by Saul Shiffman et al, they gave results as in cold and flu seasons the

cold and flu symptoms were increased and the use of paracetamol was also increased.¹⁷ In a study done by Debjani Das et al in that study the results were as the city-wide trends in the ratio of influenza like illness to analgesic sales pattern with highs in winter and lows in summer.¹⁸ So, by these studies it is concluded that the over the counter drugs sales would be raised in winter. In this study which was done in Tirupati also the OTC sales were raised in winter because in that season the population are mostly affected with common ailments so the population will consume more over the counter drugs.

The OTC drugs are mostly consumed in the form of tablets (n=40) (80%) followed by ointments (n=6) (12%), drops (n=2) (4%), syrups (n=2) (4%). Nowadays steroid preparations are mostly used in the form of ointments by the people. In a study done by Shuster S et al the adverse drug reactions caused by the steroid preparations were given as if hydrocortisone (corticosteroid) is repeatedly used on normal skin it leads to thinning, striae, telangiectasia (especially on face), perioral dermatitis, and rosacea may develop, resistance to infection will decrease and there will be increase in colonization of skin by bacteria, fungi and yeasts. If they suddenly stop the steroid preparation usage, it leads to inflamed and scaly skin.¹⁹ Various preparations of drops are available like oral drops which are preferred in infants and young children and ear and eye drops are also in use as over the counter medications. Syrups are used as over the counter drugs like cough syrups etc. mostly, they are used in young children.

From the results of the study in 17 pharmacies (34%) the pharmacists told that only 50-75% of people going to their shop are asking about drug interactions caused by OTC drugs while buying them and in other 14 pharmacies (28%) the pharmacists told that only 0-25% of people going to their shop are asking about drug interactions caused by OTC drugs while buying them. In other 12 pharmacies (24%) the pharmacists told that only 75-100 % of people going to their shop are asking about drug interactions caused by OTC drugs while buying them. In other 7 pharmacies (14%) the pharmacists told that only 25-50% of people going to their shop are asking about drug interactions caused by OTC drugs while buying them. This tells about the awareness of people in asking about drug interactions while consuming over the counter drugs from pharmacies. From the results only about 50-

75% of people are aware of asking drug interactions and almost in equal range the least number of people that is 0- 25% of people asked about drug interactions in 14 pharmacies. That means the people are not fully aware of the side effects and drug interactions caused by OTC medications. In a study done by Kanad Deepak et al the results say that 90% of study participants knew about the over the counter drugs and reluctant use of over the counter drugs are harmful, but majority use them.⁵ In a study done by El-Gamal et al., the study participants told, about 80% were advised on the over the counter drugs by pharmacists and only 53.7% read about indications, side effects, and contraindications of over the counter drugs before their use.²⁰ In a study done by Kishore et al only 68.82% said that they take information about the over the counter drugs from the shopkeeper. 32.89% said that they do not take information about the OTC drugs from the shop keeper.¹⁶ This reveals that either the people are not interested about gaining knowledge about over the counter drugs or they cannot understand the indications side effects drug interactions etc. because of illiteracy.

The complaining of adverse drug reactions by the people to the pharmacists about the OTC drugs were, in (98%) (n=49) of pharmacies only about 0-25% members are complained about adverse drug reactions caused by OTC drugs and in about (2%) (n= 1) of pharmacies 25-50% of people complained about adverse drug reactions. This reveals that most of the people did not complain about adverse drug reactions to the pharmacists. There may be several reasons for this, they are either the people do not experience the adverse drug reactions by OTC drugs consumption or people after experiencing adverse drug reactions they go the physician instead of pharmacy or they may have lack of knowledge to find that the adverse drug reactions is caused by specific drug used by them. In a study done by Kanad Deepak et al the results were, when they asked the study participants about the side effects caused by the OTC drugs 54% of people had not experienced any side effect from OTC drugs and only 44% of study participants experienced side effects from over the counter drugs.⁵ Further work for this study can be done in other aspects as in this study the consumption of OTC drugs in population was assessed by interviewing the pharmacists in the pharmacies. The OTC medication consumption was found to be high in Tirupati city because most of the

results obtained in this study show similarity to the related studies. The most commonly sold drug among 50 pharmacies was drugs used for cold and cough /anti histamines and the sales of OTC drugs is also high in pharmacies of Tirupati. There is a need of educating people and creating awareness about over the counter medications that is their indications, contraindications, side effects, drug interactions at least up to some extent so that their choice towards consuming over the counter drugs may reduce to some extent and the co morbidities caused by OTC drugs can also be reduced to some extent.

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