Review Article

# A Comprehensive Review of Over the Counter (OTC) Medications

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**ABSTRACT**

Over-the-counter (OTC) medications constitute a critical component of self-medication and primary healthcare systems, offering pharmacological interventions for minor ailments without the need for a physician's prescription. This review provides an in-depth analysis of the pharmacodynamics, therapeutic classifications, dosing protocols, administration routes, and adverse drug reactions (ADRs) associated with widely used OTC drug classes, including analgesics, antihistamines, antiemetics, antidiarrheal, and gastrointestinal agents. The paper also discusses drug–drug interactions, contraindications, and risk of misuse or toxicity arising from unsupervised consumption. The essential role of pharmacists in optimizing therapeutic outcomes through patient education and pharmacovigilance is underscored. While OTC drugs are generally safe when used as directed, improper usage may lead to delayed diagnosis, treatment failure, or severe systemic complications. Therefore, integrating evidence-based guidelines and strong counselling mechanisms is imperative to ensure the rational and safe use of OTC medications.

**Keywords:** Over the counter medication, role of pharmacist, Analgesics, Antiemetics, Laxatives.

## INTRODUCTION

OTC medications are the drugs that can be purchased without a prescription from a health care provider. These medications are used to treat minor ailments like headache, fever, cold and pains. OTC medications play an important role in healthcare provision like Accessibility, cost effective, Self-Care and Convenience, prevention and promote Health Literacy[1,2].

**Accessibility**: OTC medications are widely available in community pharmacies and do not require a valid prescription, making easy for the people for treating minor ailments like headaches, colds, or digestive issues.

**Cost-Effective**: They are generally more affordable than prescription medications and can help to reduce healthcare expenses.

**Self-Care and Convenience**: OTC drugs enable individuals to manage minor health concerns independently, reducing the need for a doctor's visit for non-severe conditions.

**Prevention**: Certain OTC medications, like vitamins and antacids, helps to prevent chronic health issues.

**Promote Health Literacy**: Health Literacy should be promoted with clear labelling.

❖ **Advantages of OTC medications:**

- OTC medicines are considered to be safe and effective for treating symptoms of minor ailments like cold, cough, fever, head ache, body aches etc.
- Patient will get rapid access to effective medicines, saves consultation charges for patient.
- Waiting time for consultation is saved for patient.
- To ensure the optimum use of OTC medicines, pharmacists can provide a valuable information to the patient regarding the dose of medicines, uses, side effects, drug interactions
- Pharmacists can dispense OTC medications

❖ **Disadvantages of OTC medications[2]:**

- By taking OTC medications there may be chances of increase drug Resistance
- Failure to follow label instructions
- By taking OTC medications with the prescription medicine may Increase potential risk of drug-drug Interactions.
- Potential for misuse and abuse for dose of drug
- Incorrect self-diagnosis of disease
- Delayed diagnosis of disease
- Incorrect treatment for Severe illness

❖ **Classification of OTC drugs:**

The most commonly used Over the counter medications with detailed information are presented in Tables 1 to 9.

**Table 1:** List of Over-the-counter medications

| Class | Examples |
|---|---|
| Pain relievers | Acetaminophen, Aspirin, Ibuprofen, Naproxen |
| Cough and cold | Levocetirizine, chlorpheniramine, guaiphenesin |
| Laxatives | Bisacodyl, calcium docusate |
| Anti diarrhoeal | Loperamide, Bismuth Sub Salicylates |
| Antiemetics | Ondansetron |
| Motion sickness | Dimenhydrinate |
| Antihistamines | Fexofenadine, loratadine |
| Heart burn and indigestion | Omeprazole, ranitidine, Cimetidine |

**Table 2:** Over-the-counter for Pain Relief[3]

| Class | Acetaminophen | Aspirin | Ibuprofen | Naproxen |
|---|---|---|---|---|
| **Category** | Analgesic and Anti pyretic | Nonsteroidal Anti-inflammatory drug (NSAID'S) | Nonsteroidal Anti-inflammatory Drug (NSAID) | Nonsteroidal Anti-inflammatory drug. (NSAIDS) |
| **Dose** | *Dose for Children under Age 2-12 yrs for Fever and pain 10-15 mg/kg 4-6 hrs.<br>*Dose for Adults for fever and pain is 325-650 mg dose every 4-6 hrs are given. | Standard Dose: 325 -500 mg every 4 to 6 hrs is recommended dose for pain and rheumatoid arthritis<br>*For children it is not recommended because it may cause serious Side Effects | Dose for Adults for fever and pain is 200-400 mg orally every 4-6 hrs as needed dose for children for fever & pain generally 5-10 mg/kg per dose is recommended for every 6-8 hrs | Dose for adults and children for fever and pain generally 220 mg dose is recommended for every 8-12 hrs |
| **Route of administration** | Through oral, rectal and intravenous route | Oral | Oral | oral, topical, rectal route |
| **Uses** | It is used to reduce fever and body pains | It is Used to reduce body pain and swelling.<br>It is used to reduce fever and headache | It is used to treat common cold, fever and body pains | Naproxen is used to treat pain or inflammation such as arthritis, spondylitis |
| **Side Effects** | Nausea, vomiting, Allergic reactions | Indigestion, Nausea, Stomach irritation | Stomach pain, indigestion, Heart burn, Nausea | Nausea, Stomach irritation, heartburn |
| **Precautions** | Limited alcohol consumption should be done | Precautions should be taken if patient is suffering from Retinopathy, Haemophilia, Stomach ulcers and should consult with a healthcare provider | Avoid using NSAIDS in patients with a history of peptic ulcers and gastrointestinal bleeding, or kidney disease as it may causes serious side effects or toxicity | Avoid taking NSAIDS if you are suffering from the history of peptic ulcer and bleeding |
| **Interactions** | Acetaminophen may interact with Warfarin (increased risk of bleeding), Acetaminophen may interact with Carbamazepine (increased hepatotoxicity) | Aspirin can interact with Warfarin and may increase the risk of bleeding | Ibuprofen in combination with diuretics may increase kidney toxicity | Naproxen can interact with prednisone which increases risk of stomach ulcers. |
| **Dose for 24 hours** | For children not exceeding 5 doses for 24 hrs.<br>*For adults' dose should. Not exceeding 4000 mg for 24 hrs. | Maximum Dose: Do not exceed 3900 mg in 24 hrs[3] | For adults the maximum dose for 24 hrs should not exceed 1200 mg/day<br>*For children<br>Maximum Dose For 24 hrs should Not exceed 40 mg/kg/day | Maximum Dose is 660mg/day[3] |

❖ **Counselling points associated with the use of NSAIDS**

- Take the medicine along with food and sufficient amount of water
- If intended relief is not felt by taking few doses of medicines then consult with a doctor
- If you are using aspirin then consult the doctor for further use of Ibuprofen or diclofenac.

  Note: Aspirin and Ibuprofen if taken in combination increases anticoagulant effects
- Inform the doctor if you have any type of allergy or Side effects after taking the medicine
- Inform the doctor about using OTC medications along with the prescription medicine because these OTC medications will have life threatening effects with other drugs

**Table 3:** Over-the-counter drugs for Cough and cold[4,5]

| Class | Levocetirizine | Chlorpheniramine | Guaifenesin |
|---|---|---|---|
| **Category** | Anti histamines | Antihistamine | Expectorant |
| **Dose** | *Adults and children 12 years of age and older 5-10ml once a day. *Children 6 to 11 yrs of age should be given 5 ml Once a day. | *Standard dose for allergic rhinitis:4 mg every 4 to 6 hrs | *Dose For cough for adults 200 to 400 mg every 4 hrs. *Dose for Children for cough under 6 to 12 years of age 100 to 200 mg every 4 hrs. *Dose for Children 4 to 6 yrs of age for cough 50 to 100 mg every 4 hrs. Children and infants up to 4 yrs of age use is not recommended |
| **Route of administration** | Oral | Oral, Parenteral | Oral |
| **Uses** | It is used to reduce allergy symptoms such as sneezing, redness, itching.[8] | *It is used to treat runny nose from allergies or cold. *It is used to treat the symptoms of an allergic reaction. | Used to treat Nasal congestion |
| **Side effects** | Itching, urinary retention, Nausea, loss of appetite, vomiting | Breathing problems, unusual sweating, loss of appetite, constipation, headache | Headache, Nausea, Vomiting |
| **Precautions** | Don't take other medicines with this medicine unless prescribed by a doctor. Limited alcohol consumption should be done | Don't take this medicine during pregnancy unless prescribed by a doctor | Inform the doctor if you are on a low magnesium diet or if you have kidney disease before taking these medicine |
| **Interactions** | Levocetirizine and diazepam in combination gives symptoms of Dizziness and Drowsiness. | Do not combine this medication with alcohol or other medications such as antidepressants, sleeping pills, anxiety medications that cause drowsiness, suppressed breathing. | Guaifenesin may interact with medications such as amiodarone, procainamide, and quinidine that effects heart rhythm |
| **Dose for 24hrs** | *Dose for Adults teenagers and elders should not exceed more than 10ml for 24 hrs *Dose for Children should not take more than 5ml for 24 hrs. | *Dose for 24 hrs For Adults for allergic rhinitis should not exceed 24mg/day *Dose for Children 6-12 years for allergic rhinitis: 2 mg orally every 4-6 hrs should be taken dose should not exceed 12 mg/day | *Dose For adults for cough should not exceed 2.4 g/day *Dose For children 6 to 11 yrs should not exceed 1.2g/day |

❖ **Counselling points associated with the use of Anti histamines**

- Avoid alcohol consumption as alcohol increase the sedative effect of anti-histamines
- Some anti histamines may not be safe during pregnancy so consult a healthcare provider before use
- Anti histamines can interact with other drugs like sedatives and antidepressants Consult a healthcare provider before use

❖ Counselling points associated with the use of Expectorant

- Drink plenty of water while taking expectorant
- Follow the prescribed Dosage and frequency to avoid unnecessary side effects
- Inform the doctor if you have any type of allergy or Side effects after taking the medicine

**Table 4:** Over-the-counter drugs for Laxatives[6-8]

| Class | Bisacodyl | Calcium docusate |
|---|---|---|
| **Category** | Stimulant Laxative | Stool softener (laxative) |
| **Dose** | Dose for Adults and children 12 yrs and older for constipation 5 to 15 mg/day<br>Dose for children 6 to 12 yrs 5 mg/day<br>For bowel preparation rectal dose<br>For Adults and children 12 yrs and older: 10 mg once daily (1 suppository).<br>Children 6 to 12 yrs: 5 mg once daily (½ of a 10 mg suppository). | Dose for Adults for constipation<br>50-400 mg in divided doses per day.<br>Dose for Children 6-12 yrs for constipation 40-150 mg orally divided in 1-4 dose per day. |
| **Route of Administration** | It Can be administered orally and rectally | Oral |
| **Uses** | Used to treat constipation and to clean out the intestines before a bowel examination or surgery. | Used to treat constipation |
| **Side effects** | abdominal pain, nausea, diarrhoea, vomiting | Diarrhoea, abdominal pain, nausea, vomiting.<br>Excessive use may lead to electrolyte imbalance. |
| **Precautions** | Drink plenty of fluids while using Bisacodyl to prevent from dehydration<br>Do not crush or chew Bisacodyl tablet swallow them with water because breaking the tablet can irritate your stomach | Calcium Docusate Should not be used if there are symptoms of abdominal pain, nausea, or vomiting.<br>Use calcium docusate carefully if patient is suffering with rectal bleeding, chronic bowel conditions and appendicitis |
| **Interactions** | Bisacodyl with diuretics like furosemide, hydrochlorothiazide may increase the risk of electrolyte imbalances and Causes hypokalaemia condition. | Calcium Docusate with diuretics like furosemide, hydrochlorothiazide may Causes hypokalaemia condition |
| **Dose for 24 hours** | Dose for Paediatric 5 mg /day<br>Dose for Adults and children12 yrs and older: 5 to 15 mg. | Maximum recommended dose for adults is 240 mg/day.[14] Maximum Paediatric dose is 40-150 mg/day |

❖ **Counselling points associated with the use of Laxatives**

- Drink plenty of water while taking laxatives, especially osmotic laxatives. This helps prevent dehydration and ensures the laxative works effectively.
- Avoid stimulant laxative during pregnancy
- Encourage the patients to monitor for side effects like diarrhoea, abdominal cramping, or bloody stools. If any of these occur, they should stop the medication and consult a doctor.
- Increase fibre intake in the diet (e.g., fruits, vegetables, whole grains) to promote natural bowel movements and avoid dependency on laxatives

**Table 5:** Over-the-counter drugs for Anti diarrhoeal[9]

| Class | Loperamide | Bismuth Sub Salicylates |
|---|---|---|
| **Category** | Anti diarrhoeal | Anti diarrhoeal |
| **Dose** | Adult Dosage for Acute Diarrhoea<br>The initial dose is 4 mg (2 tablets), followed by 2 mg after each loose stool | Dose For Adults:<br>Diarrhoea: 524 mg (30 mL liquid or 2 tablets) for 30 to 60 minutes as needed |
| **Route of administration** | Oral | Oral |
| **Uses** | Loperamide is used to control and relieve the symptoms of acute and chronic diarrhoea. | It is used to treat diarrhoea, heart burn, Nausea, traveller's diarrhoea<br>and indigestion |
| **Side effects** | Bloating, constipation, loss of appetite, nausea, stomach pain<br>vomiting. | Black or dark-coloured stool<br>Constipation, hearing loss or ringing sound due to salicylate toxicity |
| **Precautions** | Use with proper care under the supervision of prescriber in liver impairment<br>If you are taking this medicine for acute diarrhoea condition then you should not use it for more than 2 days, unless directed by your doctor. Loperamide on high doses can cause heart issues | Avoid if allergic to salicylates (like aspirin) or (NSAIDs).<br>False urine sugar test results may occur if you are taking large amounts of bismuth subsalicylate regularly. |
| **Interactions** | Using Loperamide with opioid medications can increase the risk of Severe constipation.<br>Using Loperamide with ketoconazole increase the risk of serious heart problems. | Bismuth subsalicylate may interact with hypoglycaemic drug and increase the activities of Acetohexamide drug. |
| **Dose for 24 hrs** | In adults the dose should not exceed 16 mg/day.<br>In children the dose may vary based on weight and age consult a healthcare professional | In adults the dose should not exceed 8 doses (4,200 mg) in 24 hrs.<br>Not recommended for Paediatric unless advised by a healthcare provider due to the risk of Reye's syndrome. |

❖ **Counselling points associated with the use of Anti diarrhoeal**

- Follow the prescribed dosage do not take more than the recommended dose, as this can lead to complications.
- Avoid foods that can irritate the digestive tract, such as spicy, fatty, or dairy-rich foods.
- Stick to bland foods (e.g., bananas, rice, applesauce, toast) during recovery.

**Table 6:** Over-the-counter drugs for Anti-emetics [10]

| Class | Ondansetron |
|---|---|
| **Category of drug** | Anti emetic |
| **Dose** | *Dose for Adults for nausea and vomiting chemo induced:4 mg to 8 mg, depending on the situation (e.g., chemotherapy, postoperative nausea)<br>*Dose for Children for chemo induced nausea and vomiting<br>Children (≥6 months): Typically, 0.1 mg/kg to 0.15 mg/kg depending on age and indication, up to a maximum of 4 mg dose per day |
| **Route of administration** | Oral, intravenous, intramuscular |
| **Uses** | Prevention and treatment of nausea and vomiting associated with Chemotherapy, Radiation therapy.<br>It is also used in gastroenteritis-induced nausea. |
| **Side effects** | Headache, Dizziness, Fatigue, Dry ness of mouth. |
| **Precautions** | Don't take other medicines with this medicine unless prescribed by a doctor |
| **Interactions** | Ondansetron in combination with sotalol can increase the risk of arrhythmias |
| **Dose for 24 hrs** | Maximum dose in 24 hrs: 16 mg for adults (usually divided in 4mg/day) |

❖ **Counselling points associated with the use of Anti emetics**

- If intended relief is not felt by taking the dose consult with a doctor
- Advise the patient to increase the fluid and fibre intake if constipation occurs.
- Patients with heart disease or a history of arrhythmias should use Antiemetics with caution
- Alcohol can increase the sedative effects, so it is best to avoid drinking alcohol while using the medication

**Table 7:** Over-the-counter drugs for Motion sickness

| Class | Dimenhydrinate |
|---|---|
| **Category of the drug** | Anti histamine |
| **Dose** | For Adults - 50-100 mg every 4-6 hrs<br>For Paediatric - 25-50 mg every 6-8 hrs |
| **Route of administration** | Oral, rectal, intravenous, intramuscular |
| **Uses** | used to treat nausea, vomiting and to treat dizziness caused by Motion sickness |
| **Side effects** | Constipation, blurred vision, dizziness, tachycardia. |
| **Interactions** | Dimenhydrinate in combination with selegiline<br>Increase the effects of Dimenhydrinate |
| **Dose for 24 hours** | For Adults -Maximum dose: 400 mg per 24 hrs.<br>For maximum dose of children consult a paediatrician |

**Table 8:** Over-the-counter drugs for Anti histamines

| Class | Fexofenadine | Loratadine |
|---|---|---|
| **Category of drug** | Antihistamines | Antihistamine |
| **Dose** | Adults: For allergic rhinitis 60 mg dose given twice daily or 180 mg dose once daily.<br>Children: For chronic idiopathic urticaria 180 mg once daily is given | Adult dose for allergies<br>For Adults 10 mg once daily<br>Paediatric dose<br>If body weight is ≤30 kg: 5 mg dose once daily. |
| **Route of administration** | Oral | It can be administered orally |
| **Uses** | Used to treat allergic rhinitis, chronic idiopathic urticaria | It is used to relief from symptoms associated with allergic rhinitis such as sneezing, runny nose. |
| **Side effects** | Head ache, Dizziness, Nausea, Dry mouth | Headache, Dry mouth, Fatigue, Drowsiness |
| **Precautions** | Avoid alcohol while taking Fexofenadine as alcohol may enhance the chances of drowsiness or dizziness. | Individual with liver or kidney problems may require a low dose or should use it under medical supervision |
| **Interactions** | Avoid taking antacids containing aluminium or magnesium hydroxide within 2 hrs of fexofenadine as they can reduce the absorption of fexofenadine | Ritonavir when administered with loratadine may increase loratadine levels in the body and Causes side effects to the body |
| **Dose for 24 hours** | The maximum recommended dose for fexofenadine is 180 mg per day for adults | Maximum Dose (24 hrs): 10 mg for adults and children >30 kg. |

**Table 9:** Over-the-counter drugs for Heart burn and indigestion

| Class | Omeprazole | Ranitidine | Cimetidine |
|---|---|---|---|
| **Category of drug** | Proton Pump Inhibitor | H2 receptor antagonist | H2 receptor antagonist |
| **Dose** | Gastroesophageal reflux disease (GERD): 20 mg once daily for 4-8 weeks.<br>Erosive esophagitis: 20 mg once daily for 4-8 weeks.<br>Peptic ulcer: 20-40 mg once daily for 4-8 weeks. | For adults' dose for Gastroesophageal reflux disease (GERD): 150 mg twice daily. | For adults' dose of Cimetidine 800–1600 mg per day in divided doses |

| | | | |
|---|---|---|---|
| | | For children doses vary by weight and condition. Consult a paediatrician | |
| **Route of administration** | Oral and Intravenous | Oral, IV or IM route | Oral, IV or IM route |
| **Uses** | It Is used in the treatment of Gastroesophageal reflux disease (GERD) and used in the treatment of duodenal and gastric ulcers. | It is used in treatment of ulcers, Gastroesophageal reflux disease, heartburn and indigestion | It is used in treatment of ulcers, Gastroesophageal reflux disease and dyspepsia. |
| **Side effects** | Headache, Nausea, Diarrhoea Abdominal pain | Headache, Constipation Diarrhoea. | Headache, Nausea Arrhythmias Liver dysfunction. |
| **Precautions** | Long-term Use Can lead to low magnesium levels, vitamin B12 deficiency, or increased risk of fractures. | Avoid alcohol when you are using ranitidine as it can increase stomach acid production. It should be used for longer time due to potential side effects | If you experience rashes, swelling, or difficulty breathing, seek medical attention immediately. |
| **Interactions** | Omeprazole can increase the absorption of digoxin used to treat heart conditions which may increase the risk of digoxin toxicity. | Ranitidine with Diazepam and phenytoin may increase effect in the body and leads to side effects and Ranitidine with Warfarin increases the risk of bleeding | Cimetidine may interact with Warfarin that may increase the risk of bleeding and can also interact with metformin that decrease the renal clearance of metformin |
| **Dose for 24 hours** | Maximum recommended dose is 40 mg per day | Maximum Dose for most adults is 300 mg in divided doses. | Maximum dose for adults should not exceed 2400 mg per day in Zollinger-Ellison syndrome. |

**Role of pharmacist:**

- Pharmacists play an important role in educating the patient regarding safe use of medicines and monitor a good therapeutic outcome for treatment of disease that improves the quality of life of patient
- When a pharmacists dispense OTC medication, he should counsel the patient about potential side effects of medicines
- A pharmacists should counsel the patient about appropriate use of OTC medicines with a prescription medicine
- Ex: If a patient is suffering from Nasal congestion and wanted a remedy for his clinical health concerns and the patient is hypertensive and taking Antihypertensive drug should avoid Anti cold drug such as phenyl propanolamine as these drugs may elevate the blood pressure.
- Do not dispense the medicine if patient has an allergic reaction
- Inform the patient about the proper use of medicines as directed by the physician

## CONCLUSION

Over-the-counter (OTC) medications provides appropriate and effective relief for treating minor ailments such as, pain, allergies, and cold symptoms. However, their safe use requires careful attention OTC drugs are generally considered to be safe when used as directed by physician misuse or overuse of dose can lead to adverse effects and may lead to Severe conditions hence It is always advisable to read label instructions carefully, follow them properly and consult a healthcare professional if symptoms persist for longer time proper use of OTC medications helps to maintain health and prevent complications of disease.

## DECLARATIONS

### Author contributions

All authors contributed to experimental work, data collection, drafting or revising the article, gave final approval of the version to be published, and agreed to be accountable for all aspects of the work.

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**Competing interest statement**

All authors declare that there is no conflict of interests regarding publication of this paper.

## REFERENCES


1. Rutik N Sapkal, Snehal P Kohale, Jitendra A Kubde, Pooja R Hatwar, Ravindra L Bakal, A Comprehensive review of Over-the-Counter medications: Benefits, risks, misuse, and regulatory perspectives, GSC Biological and Pharmaceutical Sciences. 2025; 31(3):128-135. https://doi.org/10.30574/gscbps.2025.31.3.0219
2. Dr. Ramesh Adepu - Community Pharmacy Practice, PharmaMed Press. 2015; pp-87-90.
3. Sangeetha N, Shaguftha Ruhi B, Shashank Gowda S, Shobitha CV, Srividya, Ravinandan A P, Syed Mansoor Ahmed. An Educational Review on Over-the-Counter Drugs: A Pharmacovigilance-Based Approach. International journal of pharmaceutical chemistry and analysis. 2024; 11(4):295-302. https://doi.org/10.18231/j.ijpca.2024.043
4. Umair Amjad, Wasiq Ali, Talha Rehman, Muhammad Aamir, Mahnoor Shahjadi, Abdullah, Muhammad Ahmed Saeed, Sohaib M, Sultan Sabri, Adeel Salah, Mahnoor Quasar, Muhammad Zahid Iqbal. Patient Knowledge and Utilization of Over-the Counter medications: A comprehensive study. J Pharm Res Int. 2024; 36(9): 131-143. https://doi.org/10.9734/jpri/v36i97583
5. Narang P, Garg V, Sharma A. Regulatory, Safety and economic considerations of Over-the-counter medicines in the Indian population. Discover Health Systems. 2023; 2(1). https://doi.org/10.1007/s44250-023-00032-y
6. Maratha PA, Kamat SK, Tripathi RK, Raut SB, Khatri NP. Over-the-counter medicines: Global perspective and Indian Scenario. J Post grad Med.2020; 66(1):28-34. https://doi.org/10.4103/jpgm JPGM-381-19
7. https://emedicine.medscape.com/article/2172407-overview
8. https:// www.mayoclinic.com
9. https://www.medbroadcast.com
10. https:// www.medicalnewstoday.com


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