

**OVER THE COUNTER MEDICINE ABUSE****Dr. Rama Rao Tadikonda<sup>1\*</sup>, Sravya K.<sup>2</sup> and Hasan Baig<sup>2</sup>**<sup>1</sup>Principal & Professor, CMR College of Pharmacy, Medchal, Kandlakoya- 501401.<sup>2</sup>CMR College of Pharmacy, Medchal, Kandlakoya-501401.

Received on: 23/01/2023

Revised on: 13/02/2023

Accepted on: 03/03/2023

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501401.**ABSTRACT**

Self medication is one of the essential components of any health care systems. OTC medicines are increasingly used for self medication, but such products may increase the abuse potential in patients. Pharmacists being first line of contact for patients, have the opportunity to educate and counsel patient on appropriate OTC medication use. The main aim of this article is to provide a brief review on OTC medications with abuse potential and also further it provides the factors, reasons for OTC abuse and harms related to OTC medication abuse. This article also provides importance of patient and pharmacist interaction. This review gives knowledge on the barriers faced by pharmacists in OTC medication abuse. The current health system should work more effectively to provide a striking balance between the purchase of OTC medication and their abuse.

**KEYWORDS:** Self medication, medication, pharmacist, abuse, Over the counter.**INTRODUCTION**

The ability to directly purchase medications is one of the methods through which people can receive medications in addition to the standard prescriptions from doctors. The community or retail pharmacy, where the metonymic phrase over-the-counter (OTC) originated and is used to denote such medications, is the most striking example of this. It has been stated that such accessibility has advantages in terms of easy access to and choice of medications as well as engaging people as active participants in their own health and illness treatment.<sup>[1]</sup> Over-the-counter (OTC) or nonprescription drugs are those that patients can purchase without a doctor's prescription for the treatment of common ailments. Numerous problems, including headaches, the common cold, musculoskeletal discomfort, allergies, cigarette dependence, and heartburn, can be prevented and treated using over-the-counter medicines.<sup>[2]</sup> However, there is always a risk involved in using OTC medications.<sup>[2,3]</sup> These include improper self-diagnosis, inappropriate dosage, addiction issues upon prolonged use, adverse drug reactions, and drug interactions.<sup>[4,5]</sup> Over-the-counter (OTC) medicine abuse by patients has become more well recognized in recent years, particularly among adolescents and young adults.<sup>[6]</sup> Drug abuse is described as the use of a substance for its psychoactive effects rather than for a medical purpose. OTC drugs are easily abused since they are cheap, legal, and widely accessible (in grocery stores, pharmacies, and online), and there is no age restriction or quantity purchase limit. Many patients believe that over-the-counter pharmaceuticals are less dangerous than prescription or illegal drugs.<sup>[7]</sup> In addition to having benefits for patients, self-medication benefits healthcare systems by allowing pharmacists to

use their clinical expertise more effectively, increasing access to medications, and possibly lowering the cost of prescribed drugs for publically supported health programs.<sup>[8]</sup>

However, the growing accessibility of over-the-counter medications may lead some people to think that there is a medicine for every ailment. Additionally, the usage of such products may hinder or conceal a serious illness' diagnosis,<sup>[9]</sup> higher risk of interactions, adverse reactions, and of self-treatment when medical help should have been sought.<sup>[10,11]</sup> OTC abuse has also been linked to notable drug interactions, impacts on physical and mental health, individual variations in reactions, and considerable socioeconomic implications on users, their families, and the larger community.<sup>[12,13,14]</sup> The purpose of this article is to provide a brief overview of OTC medication abuse, its scope, the role of pharmacists in addressing this issue, and the necessary steps that pharmacists and the pharmacy profession must take going forward to address the problem with a national impact.

**OTC medication abuse****OTC medications with most potential for abuse**

Numerous over-the-counter medicines have misuse potential. Antihistamines, sleeping pills, caffeine, ephedrine, pseudoephedrine, antitussives and expectorants, dextromethorphan, laxatives, anabolic steroids, and sildenafil are among the drugs that are frequently abused.<sup>[15,16,17]</sup> Abuse of laxatives for weight loss and use of excessive doses of antihistamines for pleasure.<sup>[18]</sup> Opiate-based combo products, cough and cold treatments containing dextromethorphan, sleep aids,

antihistamines, analgesics, hypnotics, and laxatives have all been identified as having abuse potential in research on OTC pharmaceutical abuse conducted around the world. The most commonly abused pharmaceuticals are painkillers and cough syrups. The most frequently accused drugs of abuse are OTC cough and cold remedies and those with codeine or other opioid ingredients.<sup>[19,20,21]</sup> In

the US, codeine cannot be purchased over-the-counter. However, it is a major medication with abuse risk in other nations.<sup>[22]</sup> The most often misused medicine, according to numerous research, is over-the-counter (OTC) codeine analgesics.<sup>[23,24,25]</sup> Some of the OTC drugs with abuse characteristics.<sup>[26]</sup> are listed in tables 1-4.

**Table 1: Drug classification and main characteristics of misuse of the selected OTC drugs.**

Drug/drug classification	Administration path	Mechanism of action	Effects	Does it cause dependence?	Street names and brand names
Chlorpheniramine(antihistamine)	Oral	<p>*Chlorpheniramine acts primarily as a potent H1 antihistamine drug</p> <p>*Moderate anticholinergic activity</p> <p>*Chlorpheniramine has been found to act as a serotonin reuptake inhibitor</p>	<p>ACUTE EFFECTS: psychiatric effects: (i) sedating and anxiolytic properties;(ii) its abuse has been related to pleasurable feelings such as euphoria and stimulating effects; (iii) it may be associated with psychotic symptoms in predisposed individuals (e.g., people with mental illnesses or individuals concomitantly abusing other drugs)</p> <p>CHRONIC EFFECTS: dependence</p>	<p>*Drug dependence is recorded after long-term use</p> <p>*Withdrawal symptoms, including excessive irritability, anger outbursts, insomnia, sweating, and craving</p>	<p>“Triple c” refers to Coricidin® cough and cold tablets; the combination of codeine, methyl ephedrine chlorpheniramine, and caffeine is marketed as Bron®; Panadol® is a combination of chlorpheniramine, paracetamol and pseudoephedrine; Advil® includes ibuprofen, chlorpheniramine and phenylephrine; other brand names: Polaramine®, Chlortrimeton®</p>
Codeine (opioid)	Oral, IV	<p>It is a selective agonist of the mu-opioid receptor; it is a natural isomer of methylated morphine, requiring metabolic activation by O-demethylation to morphine by CYP2D6</p>	<p>• ACUTE EFFECTS: psychiatric effects: euphoria, elation, analgesia, calmness; physical effects: respiratory depression, extreme somnolence progressing to stupor or coma, skeletal</p>	<p>• Codeine has an identified abuse liability potential, given its effect and development of tolerance within a short timeframe on regular or excessive use</p> <p>• Codeine-dependence was here recorded, and associated with daily use of codeine</p>	<p>Street names: “Captain Cody,” “Cody,” “Little C,” “Schoolboy,” “Doors &amp; Fours.”</p> <p>Common brand names for codeine and codeine containing combinations: Aspalgin® for aspirin and codeine; Nurofen Plus® for ibuprofen and codeine; Panadeine Forte® for</p>

			muscle flaccidity, cold and clammy skin, and sometimes bradycardia and hypotension. The triad of coma, pinpoint pupils, and respiratory depression is strongly suggestive of opiate poisoning. In severe overdose, death may occur CHRONIC EFFECTS: dependence		paracetamol and codeine
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**Table 2: Drug classification and main characteristics of misuse of the selected OTC drugs.**

Drug/drug classification	Administration path	Mechanism of action	Effects	Does it cause dependence?	Street names and brand names
Dextromethorphan (DXM) (non-competitive NMDA receptor antagonist and sigma 1 agonist antitussive)	Oral; IV and IN use also recorded in misuse cases	<ul style="list-style-type: none"> <li>At high doses, acting as a NMDA receptor antagonist, DXM and its potent metabolite dextropropranolol inhibit the excitatory amino acid and neurotransmitter glutamate, causing hallucinogenic and dissociative states</li> <li>DXM also exhibits binding activity at serotonergic receptors</li> </ul>	<p>*Neurobehavioural effects begin within 30–60 min of ingestion and persist for approximately 6 h</p> <p>*They are dose-related, starting from a mild to moderate stimulation with restlessness and euphoria (100–200mg), to a state characterized by hallucinations, paranoia, perceptual distortions, delusional beliefs, ataxia, and out-of-body experiences (&gt;1,000 mg)</p> <p>*ACUTE EFFECTS: (i) psychiatric effects: euphoria, altered mental status, mania, mood lability, irritability, dysphoria, insomnia; (ii) physical effects:</p>	<p>Although DXM is not thought to have addictive properties, its chronic use might determine addiction due to GABAergic/antiglutamatergic mechanisms, including substance-taking compulsive behaviors, tolerance, and autonomic withdrawal symptoms</p> <ul style="list-style-type: none"> <li>EMCDDA: regarded as NPS</li> </ul>	<p>Street names: “Bromage,” “Brome,” “Candy,” “Dex,” “Dextro,” “DM,” “Drex,” “DXM,” “Red Devils,” “Robo,” “Rojo,” “Skittles,” “Triple C,” “Tussin,” “Velvet,” and “Vitamin D,” “Poor Man’s Ecstasy”; the practice of using large amounts of DXM to achieve psychoactive effects is known as “robotripping.”</p> <p>Common brand names are: Balminil DM®, Benylin DM®, Bronchophan®, Buckley’s D®, Calylin #1, Delsym®, Koffex DM®, Novahistex</p>

			<p>tachycardia, hypertension, vomiting, mydriasis, diaphoresis, nystagmus, dystonia, loss of motor coordination;</p> <p><b>CHRONIC EFFECTS:</b> (i) toxic psychosis and cognitive deterioration; (ii) folate deficiency and neuropathy; (iii) since DXM is produced as the crystalline hydrobromide salt, bromism is a rare consequence that has been identified in heavy chronic abusers of DXM (neurotoxic effects, resulting in somnolence, psychosis, seizures, and delirium)</p>		DM®, Robitussin®
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**Table 3: Drug classification and main characteristics of misuse of the selected OTC drugs.**

Drug/drug classification	Administration path	Mechanism of action	Effects	Does it cause dependence?	Street names and brand names
Diphenhydramine (DPH) (antihistamine moiety of dimenhydrinate/DH)	Oral; IV and IN use also recorded in misuse cases	<ul style="list-style-type: none"> <li>It is a first generation H1-antihistamine</li> <li>Diphenhydramine also acts as a potent anticholinergic agent</li> <li>It can acutely block the cell membrane pump mechanism of central 5-hydroxytryptophane and peripheral noradrenaline neurons</li> </ul>	<p><b>ACUTE EFFECTS:</b> (i) psychiatric effects: euphoria, altered mental status, hallucinations, and/or psychosis; (ii) physical effects: tachycardia, xerostomia, mydriasis, blurred vision, ileus, urinary retention, CNS depression, agitation, and hyperactivity</p> <p><b>CHRONIC EFFECTS:</b> dependence</p>	Reported cases of DPH dependence have resulted from usage of large doses (often over 1,000 mg per day) over periods of months or years. Withdrawal symptoms include craving, worsening of insomnia, rhinorrhoea, nausea, irritability, restlessness, abdominal cramps, sweating, and diarrhea. Gradual tapering has been the only described detoxification treatment plan	Different brand names, including Benadryl®, Dimedrol®, Daedalon®, Sominex®, Unisom® and Nytol®
Promethazine (antihistamine)	Oral	It is a phenothiazine derivative and a H1 receptor antagonist; It also acts as a	<b>ACUTE EFFECTS:</b> from mild sedation and CNS	EMCDDA: regarded as NPS Dependence might develop after long-	Promethazine mixed with a soft drink and/or alcohol

		direct antagonist at muscarinic (M1) and dopamine (D2) receptors. It is classified as a first-generation antihistamine molecule which easily penetrates the blood-brain barrier and is associated with adverse effects such as sedation	depression to profound hypotension, respiratory depression, unconsciousness, and sudden death; overdose might determine an antimuscarinic delirium, agitation and neuroleptic malignant syndrome it can be used to enhance effects of other co-ingested substances, e.g., opioids <b>CHRONIC EFFECTS: NR</b>	term use of promethazine cough mixtures (containing opioids)	is known as “purple drank,” “lean,” “syzzurp,” “Texas tea”; Phenergan® and Phenadoz® are common brand names
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**Table 4: Drug classification and main characteristics of misuse of the selected OTC drugs.**

Drug/drug classification	Administration path	Mechanism of action	Effects	Does it cause dependence?	Street names and brand names
Pseudoephedrine (decongestant)	Oral; IV use also recorded in misuse cases	Sympathomimetic properties, exerting stimulating action on alpha, beta1-, and beta2-adrenergic receptors	ACUTE EFFECTS: stimulant effects, e.g., euphoria, insomnia, diminished sense of fatigue, anorexia, and accelerated thinking; psychotic symptoms with auditory and visual hallucinations, persecutory delusions, fear, disorganized behavior might develop after high-dose consumption  CHRONIC EFFECTS: dependence	Dependence might be developed after long-term use Withdrawal symptoms include: dysphoria, restlessness, abnormal perceptions Due to the possibility to be used to manufacture the class A controlled drug methyl amphetamine, restrictions have been in place in the UK to manage the risk of products containing pseudoephedrine and ephedrine; in the US, a prescription is not needed in most States, and in remaining States there are limits on how much an adult subject can buy each month	“Chalk,” “Crank,” “Meth,” “Speed”; ‘Russian Cocktail’ includes pseudoephedrine consumed together with potassium permanganate and acetylsalicylic acid diluted in water; common brand names: Sudafed®, Nexafed®, Zephrex-D®; Claritin® includes pseudoephedrine and loratadine

**Factors, reasons and circumstances involved in OTC medicines abuse**

The main medical reason for people abusing over-the-counter analgesics including paracetamol, NSAIDs, and other combination analgesics was managing acute and chronic pain.<sup>[27,28,29]</sup> On the other hand, codeine-based analgesics, dextromethorphan, sedative antihistamines, and loperamide were among the OTC medications that were often reported to be abused for non-medical purposes. People who were dependent on loperamide and codeine-based analgesics explained their dependence by saying that they used it to injure themselves or commit suicide in certain cases and to prevent acute opioid withdrawal symptoms.<sup>[27,30,31,32,33,34]</sup> Behavioral, cultural, social, and health issues were all implicated as additional risk factors in the inappropriate use of OTC medications. For instance, socioeconomic factors such as personal and marital issues, living alone, childhood experiences of a negative divorce process, unemployment and low self-esteem, low educational level and occupation, and dextromethorphan addiction and codeine dependence were linked.<sup>[35,35,36]</sup> The higher risk of abusing OTC medications among the elderly has been linked to poor health state, including decreased visual acuity, chronic disorders requiring polypharmacy use, and advanced age.<sup>[37]</sup> Additionally, health illiteracy, poor levels of education, and misinterpretation of OTC drug instructions were found to be associated with the incidence of misuse in a variety of groups, including the elderly and those residing in both developed and developing nations.<sup>[37,38,39]</sup> The practise of abusers varied

from one country to the next. For instance, Jordanian pharmacists have seen that OTC antihistamine abusers mix the medication with beverages (such as soft drinks or alcohol) or water pipes, whereas in Yemen, suspected abusers always chew Khat or carry it with them when visiting the pharmacy. However, abuse of OTC medications was linked to addiction to alcohol and use of illegal drugs in wealthy nations.<sup>[40,41,42,43]</sup>

**Harms related to OTC medicine abuse**

Three major types of issues and harms related to the abuse of OTC medications were identified (Fig. 1). First, there were immediate negative consequences brought on by the pharmacological or psychological effects of the abused or misused substance. Second, there were physiological damages brought on by another active ingredient's unfavourable effects in a compound composition. Concerns about overdoses and presentations to emergency services were caused by both of these sorts of harm. Third, there were the harms brought on by other outcomes, such as the development of drug misuse from one substance to another, monetary costs, and repercussions on personal and social life. Addiction and reliance to an opioid like codeine were among the direct hazards.<sup>[44,45,46]</sup> Convulsions and acidosis from a codeine and antihistamine (diphenhydramine) containing antitussive drug.<sup>[47]</sup> and tachycardia, hypertension, and lethargy from abusing Coricidin cough and cold tablets (dextromethorphan and chlorphenamine) were other direct issues.<sup>[48]</sup>

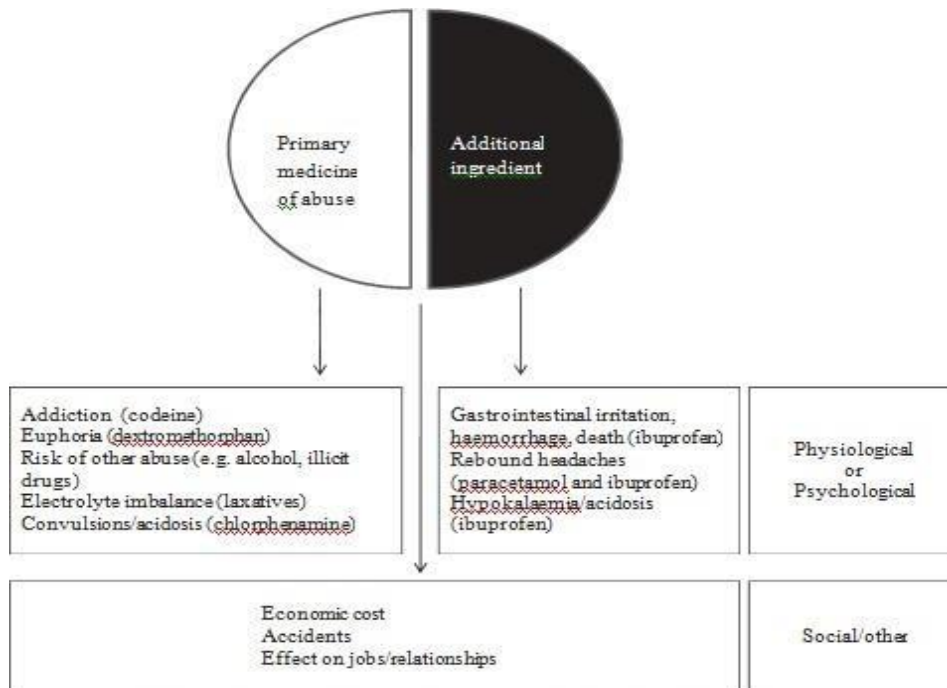


Figure 1. Examples of types of harm associated with OTC medicine abuse.

**Pharmacy Based Efforts to Address OTC Medicine Abuse**

**Pharmacist’s Role in OTC Medicine Abuse**

The prevalence of chronic illnesses has been rising over

the past several years, which has resulted in a decrease in the complex medication usage and greater duty on the part of pharmacists to provide broader services.<sup>[49]</sup> By gathering patient medical histories and reconciling their



medical records, pharmacists have shown they have a significant impact on hospitals.<sup>[50]</sup> The position of a pharmacist is becoming more and more important in healthcare. The first point of contact when buying OTC drugs is a pharmacist. A specific population's OTC drug must be routinely monitored by pharmacists.<sup>[51]</sup> For instance, pharmacists should keep an eye out for older patients and patients who need refills frequently.<sup>[52]</sup> Pharmacists can prevent the misuse of over-the-counter drugs by proactively developing their clinical expertise and informing patients both orally and in writing about

the drugs. Prescription drug management systems come in many forms, and in addition to refills, OTC medications should also be included in these plans. Pharmacists have employed a number of strategies in the past to reduce OTC medication abuse, but the top three are hiding the compromised medications from view, interrogating pharmacists while refilling the medication, and refusing to sell any compromised products.<sup>[53]</sup> Common strategies followed by pharmacists to control OTC medication abuse<sup>[51,54]</sup> are listed in table 5.

**Table 5: Common strategies by Pharmacists to control OTC medication abuse.**

Specific locations	Strategies initiated by pharmacists
Pharmacy	<ol style="list-style-type: none"> <li>1. Declining sales of implicated OTC medications</li> <li>2. Immediately contact other pharmacies of the suspicious behaviour of the patient abusing OTC medication</li> <li>3. Declaring products were out of stock</li> <li>4. Prevent medication by hiding the supplies</li> <li>5. Giving only a few amounts of medication</li> </ol>
Patient Participation	<ol style="list-style-type: none"> <li>1. Providing counseling to the patients on the potential abuse of the OTC medications</li> <li>2. Raising awareness through the internet and support groups for advising patients</li> <li>3. Giving out information leaflets</li> </ol>
Involvement Of the	<ol style="list-style-type: none"> <li>1. Providing consultation and engagement by the doctor</li> <li>2. Giving referral to the physician</li> </ol>
Doctor and other services	<ol style="list-style-type: none"> <li>3. Utilizing the services of private clinics</li> <li>4. Using special services of drug and alcohol abuse</li> </ol>

### Barriers for Pharmacists to prevent OTC Medication Abuse

The monitoring of OTC medication usage poses pharmacists with numerous difficulties. It is uncommon for pharmacists to keep records of over-the-counter medications, which makes it difficult to obtain the data required to make informed counseling decisions. Adrea et al. performed a survey in 2005 to assess drug-related issues.<sup>[55]</sup> Community pharmacists were the target of the study, and they were designed to keep basic patient data such drug interactions, prescription and over-the-counter medication, and patient information. 10,427 drug-related issues were found in the pharmacists' findings. Drug interactions were responsible for the majority of drug-related issues. According to the study's findings, pharmacists are in charge of ensuring that prescription and over-the-counter medications are used correctly, but their contribution to healthcare has to be acknowledged. The US federal government passed the Combat Methamphetamine Epidemic Act of 2005 (CMEA).<sup>[56]</sup> with the possibility of OTC drug misuse in mind. This law was passed to limit how much pseudoephedrine can be bought from a pharmacist. This law's primary goal was to reduce the unlawful production of methamphetamine, which may be made from drugs like ephedrine and pseudoephedrine, which are found in many over-the-counter cough and cold remedies. The CMEA has maintained a limit on the monthly purchase of pseudoephedrine at nine grams. OTC drug abuse has

increased as a result of the shortage of pharmacists who are responsible for supervising its use. Additionally, the legal regulations governing the sale of OTC medications are not up to date and are not even being maintained.<sup>[55]</sup> For instance, research by Tommy et al. demonstrated that pharmacists in community pharmacies were overworked. The patient's abuse of OTC medications received less attention due to the pharmacists' increasing workload. Although they are few in number, pharmacy technicians also contribute significantly to avoiding OTC medicine abuse by adding an extra layer of patient protection.<sup>[57]</sup>

### CONCLUSION

Based on the current systematic review, OTC abuse is a growing public health concern that can have negative effects including drug-related toxicity, addiction, and mortality. These days, the CoViD-19 epidemic has probably made these abusing behaviours more common as many users switched from street drugs to prescription/OTC medicines.<sup>[58,59]</sup> Indeed, OTC medications are easily available and regarded as reasonably safe due to their favourable legal position, which is why they are accepted in a "pill-popping culture".<sup>[60]</sup> Ad hoc treatment protocols must be created, and prophylactic actions must be planned. The adoption of a number of related concerns, such as schedule changes, effective surveillance, improved usage detection in clinical and pharmacy practice, and encouragement of

public health awareness campaigns should be the center of these actions.<sup>[61,60,62,63,64,65]</sup> To address the OTC misuse issues, a variety of professionals should be involved, including doctors, especially general practitioners (GPs), who can assist OTC misusers in early drug-related problem recognition and refer them to the appropriate service (e.g., mental or addiction services); they should also take note of rapid increases in the amount of medication needed or frequent, unscheduled refill requests and uncover potential "doctor shopping" practices. Doctors will still play a crucial role in ensuring that patients utilize prescriptions correctly, adhere to the recommended dosage schedule, and are aware of any possible drug interactions with other licit or illicit drugs.<sup>[60,62,66,67,68,65]</sup> On the other hand, because they are the first to notice problems with prescription drug addiction, pharmacists should keep an eye out for any falsifications or changes to prescriptions. Furthermore, prescription drug monitoring programs might help medical practitioners spot patients who are receiving prescriptions from several sources.<sup>[60,69,62,70,66,65,71,72]</sup> Last but not least, drug abuse prevention programs could offer helpful tools for increasing public awareness and preventing drug addiction. [https://stopmedicineabuse.org.<sup>[71]</sup>

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