LITERATURE REVIEW ON MISUSE OF OTC DRUGS IN THE COMMUNITY: PATTERNS, CAUSES, AND SOLUTIONS

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Abstract

This study aims to systematically examine the misuse of over-the-counter (OTC) drugs in the community based on national and international research published between 2020 and 2025. A qualitative literature review was conducted by thematically analyzing 15 relevant scientific articles. The findings indicate common misuse patterns, including consumption without medical indication, overdose, long-term use, and neglect of side effects or drug interactions. The contributing factors are multifactorial, such as low medication literacy, misleading advertisements, misconceptions about OTC safety, and inadequate pharmacist supervision. On the other hand, proposed solutions include community-based educational approaches, redesign of pharmacy systems, and the utilization of digital health technologies such as telepharmacy. These findings highlight the urgent need for integration of public education, regulation, and service innovation to reduce the risk of OTC misuse.

Keywords: *Over-the-counter drugs, Misuse, Medication literacy, Self-medication, Telepharmacy*

INTRODUCTION

Over-the-counter (OTC) medications are available without a prescription and are designed to provide quick access to the treatment of mild symptoms. The availability of over-the-counter medications aims to improve the efficiency of healthcare services, particularly for people experiencing minor health problems that do not require further medical intervention. However, easy access to over-the-counter medications also poses a risk of misuse or even abuse, particularly in communities with low drug literacy. According to Algarni et al. (2021), approximately 16% of people in various countries make mistakes in consuming OTC medications, and approximately 7% develop dependence. The most commonly abused medications are codeine, loperamide, antihistamines, and decongestants. This demonstrates that OTC abuse is a global phenomenon that requires cross-sectoral attention, including health, regulation, and public education. Clinically, inappropriate use of OTC medications can have serious health consequences. One common example is the use of paracetamol exceeding the recommended dose, which can lead to hepatotoxicity or liver damage. High doses of paracetamol produce a toxic metabolite, N-acetyl-p-benzoquinone imine (NAPQI), which exceeds the liver's detoxification capacity and causes hepatocyte necrosis. In several countries, such as the UK and the US, paracetamol overdose is a leading cause of acute liver failure, resulting in thousands of hospitalizations each year (Anindyaguna et al., 2022).

Furthermore, the use of antibiotics without indications or prescriptions is another common problem, particularly in developing countries. A meta-analysis conducted in Ethiopia reported that the prevalence of antibiotic self-medication reached 46%, which carries a high risk of triggering antimicrobial resistance (AMR), a serious threat to global public health (Ayenew et al., 2024). In Indonesia, the phenomenon of over-the-counter medication misuse has also been studied in various empirical studies, providing a clear picture of public literacy and behavior. For example, a study by Fany Septyasari et al. (2023) in Karangduren Village, Kebonarum District, Klaten, found that although 50.7% of respondents had a good knowledge of OTC medications, many still made errors in determining dosages and drug classifications. This finding is similar to that in Madura, as revealed by Kurniasari et al. (2021), who reported that only 46.9% of residents of Bettet Village, Pamekasan, understood the correct classification and storage of medications, indicating low drug literacy at the local level. On the other hand, digital developments add a new dimension to people's self-medication behavior. A study by Azzahra et al. (2023) in Surabaya, published in the Journal of Community Pharmacy, showed that the majority of respondents were active

D3-S1 students, where 41.7% of the 199 drugs purchased online were over-the-counter drugs, and the most popular platform was Halodoc (61.4%). This finding confirms that easy access through online health applications opens a direct path for consumers to purchase OTC drugs without consulting a healthcare professional. Furthermore, the factors causing errors in the use of over-the-counter drugs have been shown to be multifactorial. Hadi & Destiwati (2024) in a study in West Java explained that non-prescription television advertisements significantly influence self-medication behavior to treat flu symptoms, with the results of a regression analysis showing a t-value of 14.63 (p<0.05), indicating that advertisements have a strong influence on the decision to purchase OTC drugs without medical supervision.

The penetration of online platforms that facilitate the purchase of OTC drugs also contributes to accelerating the spread of invalid information. Azzahra et al.'s (2023) findings noted that although 63.4% of respondents had moderate literacy, many did not understand regulations related to online platforms, increasing the risk of using substandard drugs. This phenomenon thus demonstrates that self-medication is not solely caused by low literacy but is also triggered by the misperception that over-the-counter drugs are always safe, as well as by external factors such as advertising, economic considerations (avoiding consultation fees), and digital transformation. This combination of factors reinforces the urgency of conducting a literature review on patterns and misuse of over-the-counter drugs, with the aim of formulating more relevant and contextual educational solutions and health policies.

LITERATURE REVIEW

To understand the phenomenon of over-the-counter (OTC) medication misuse, the most relevant theoretical approach is the Health Belief Model (HBM). This model emphasizes that individual behavior in health decision-making is influenced by perceptions of vulnerability, seriousness, benefits, and barriers, as well as self-efficacy and cues to action. In the context of OTC use, someone who feels capable of treating minor illnesses and is not threatened by side effects will be more likely to self-medicate without medical supervision. Conversely, perceptions of dangers such as liver damage from paracetamol overdose or antibiotic resistance can reduce this tendency if accompanied by adequate understanding (Janz & Becker, 1984; Rosenstock, 1974). Another behavioral theory that supports the previous opinion is the Theory of Planned Behavior (TPB), which explains that a person's behavior is determined by its intensity, which is formed from attitudes toward the behavior, subjective norms, and perceived behavioral control. In this case, positive attitudes toward the "convenient and quick" use of OTC drugs, social influence from friends or family who regularly use over-the-counter medications, and the belief that buying drugs online is easy and controllable all contribute to the decision to self-medicate. A study by Lisa Pineles and Rick Parente found that perceptions of the benefits of OTC analgesics and repeated pain experiences were strong predictors of the intensity and behavior of OTC drug use (Pineles & Parente, 2013).

Furthermore, health literacy, and specifically medication literacy, is a crucial foundation for understanding the labels, dosages, and side effects of over-the-counter medications. Individuals with low medication literacy are more likely to make medication errors, such as misreading directions, being unaware of drug interactions, and not knowing maximum dosage limits. A study by Masumoto et al. (2023) in the Journal of Pharmaceutical Policy and Practice showed that patients with high medication literacy were better able to report side effects from OTC medications and were more cautious in their use. These theoretical findings are supported by various empirical studies, both internationally and in Indonesia. A study by Ma and Zhang (2025) in China found that 97.5% of adolescents used over-the-counter medications in the past year, but only 23.8% had an adequate understanding of dosage and side effects. This suggests that despite high access to OTC medications, literacy and oversight remain limited, particularly among young people who rely on social media and marketplaces for health information. Meanwhile, a study in Armenia by Nazaryan et al. (2024) found that trust in pharmacists remains low, leading many individuals to make self-medication decisions without consulting a pharmacist, including regarding the use of antibiotics and over-the-counter cough medicines. In Indonesia, similar findings have emerged from several local studies. Fany Septyasari (2023), in a study in Klaten, Central Java, found that although most people have basic knowledge about over-the-counter medications, their use remains largely incorrect, particularly regarding dosage and selecting appropriate medication types. Kurniasari et al. (2021) also revealed that in Pamekasan, Madura, only 46.9% of people could differentiate between over-the-counter and prescription medications and store them properly. Furthermore, a study by Azzahra et al. (2023) in Surabaya noted that 41.7% of OTC drug purchases were made through online applications like Halodoc without consulting a healthcare professional, highlighting the potential risks of digital transformation in people's drug consumption behavior.

External factors such as advertising also contribute significantly to OTC misuse. Hadi and Destiwati (2024) in their survey in West Java stated that exposure to television advertisements significantly influences people's decisions to purchase and consume over-the-counter cold medication, especially when packaged with narratives of convenience and instant healing. On the other hand, online health platforms and telepharmacy services, which have boomed during the pandemic, have the potential to improve literacy and access to pharmacist consultations, but only if designed with an inclusive and educational interface. A study by Alfian et al. (2024) showed that the success of telepharmacy services is largely determined by trust, digital education, and ease of application navigation., Thus, this literature review demonstrates that the HBM, TPB, and drug literacy theories can explain various individual, social, and structural factors influencing OTC drug use. Strengthened by empirical findings from various countries and within the country, this research aims to systematically understand patterns of OTC misuse in society, particularly within the increasingly complex digital landscape, in order to develop contextual educational and policy recommendations.

METHOD

This study used a literature review method to deeply analyze health patterns of over-the-counter (OTC) drug use based on previous research, both domestic and international. The approach used was qualitative, critically examining various relevant scientific sources, such as Google Scholar, PubMed, DOAJ, and Garuda. Inclusion criteria included articles published between 2020 and 2025, written in Indonesian or English, and covering topics related to self-medication, drug literacy, and OTC use. The data search used keywords such as "over-the-counter misuse," "drug literacy," and OTC use. All selected articles were analyzed thematically to identify error patterns, causal factors, and recommended strategies for addressing OTC drug misuse.

RESULTS AND DISCUSSION

To gain a comprehensive understanding of the dynamics of over-the-counter medication misuse in the community, researchers conducted a literature review of several scientific articles published between 2020 and 2025. The literature reviewed encompassed various methodological and geographic approaches, both from Indonesia and abroad, providing a representative picture of the patterns, causal factors, and solutions offered to address the problem. The findings from these studies are summarized and presented in Table 1 below:

Table 1. Research Findings Related to Over-the-Counter (OTC) Medication Misuse
2020-2025 period

No.	References & Years	Method & Location	Key Findings
1	(Sudhewa et al., 2023)	Survey of pharmacies in Bali (n=400)	Self-medication during the pandemic is driven by personal motivation, cost reduction, and barriers to medical access. 91.3% of respondents are aware of the adverse effects but still use OTC medications without consulting a doctor.
2	(Ilma et al., 2024)	Pharmacy student survey	Students have positive knowledge and attitudes toward telepharmacy, but practical experience is still limited, demonstrating the potential of digital education as a strategy to mitigate OTC misuse.
3	(Fathorrahman et al., 2025)	Survey of Indonesian community pharmacists	Pharmacists support telepharmacy, hoping for a more active role in online OTC education.
4	(Alfian et al., 2024b)	Mixed Methods, Bandung	The "ask a drug" telepharmacy app scored borderline in usability; users requested a more adequate interface and educational content.
5	(Medisa et al., 2020)	Survey in Sleman Yogyakarta (n=339)	49.9% of the public has sufficient knowledge, analgesics are the most common; OTC advertising is the main source of information (39.5%), significantly exceeding information from health workers (2.4%).
6	(Nasif et al., 2023)	Pharmacy survey in	Only 37% of drug releases were correct by

		Padang	pharmacists for adult coughs, indicating OTC misuse due to inappropriate recommendations.
7	(Indiani et al., 2023)	Survey of UNSIKA students, Karawang (n=392)	Students are influenced by literacy, trust in manufacturers, and usage preferences; statistically significant (p<0.001)
8	(Ghinan Sholih et al., 2022)	Community service in Karawang	Community education increases public understanding of the rational use of OTC.
9	(Smith et al., 2014)	Systematic review of 29 randomized clinical trials in various countries	There is no evidence that OTC medications are effective in relieving acute cough in either children or adults. Research highlights the risk of side effects, and recommends education and consideration of non-pharmacological options as initial options.
10	(Sinuraya et al., 2023)	Survey in Indonesia (n=582)	There were significant differences in knowledge scores based on gender, education, and employment status. Respondents had higher knowledge of pacetamol than NSAIDs. Attitudes were rated low, but analgesic use practices were quite positive. Predictors of good practice included gender, residence near a health facility, and adequate knowledge of NSAIDs.
11	(Al Mazrouei et al., 2021)	Observational study at 12 pharmacies in the UAE during the pandemic	In pharmacies with virtual services, the rate of pharmacist intervention for OTC misuse was lower (78.8%) than in traditional pharmacies (91%), but crucial interventions were more frequent in virtual services. Cough medicine and codeine were particularly prone to misuse.
12	(Algarni et al., 2021b)	Systematic review, 53 global studies	The prevalence of misuse is 16%, abuse is 2%, and dependence on OTC drugs such as codeine, DXM, and antihistamines is 7%. Risk factors include advanced age and certain drug categories.
13	(Gilson et al., 2021)	Community pharmacy intervention pilot, in the US	The redesign of the pharmacy system reduced misuse in the elderly, encouraged reassessment of drug labels and patient education for safe OTC.
14	(Chladek et al., 2024)	Observational in the US in the elderly	Approximately 80% of older adults misuse OTC medications, including overdosing and long-term use. Many drug interactions go undetected because they are not recorded in medical records.
15	(F. Azzahra et al., 2024)	Scoping review Indonesia (2019-2022)	Herbal and OTC use increased during the pandemic, literacy understanding of potential interactions remains low, requiring inclusive education.

The table above summarizes the findings from various national and international studies examining patterns, causes, and solutions to over-the-counter (OTC) medication misuse in the community. The diverse methodological approaches and research contexts demonstrate that this issue is multidimensional, encompassing aspects of knowledge, behavior, regulation, and even digital transformation in healthcare. These findings are then analyzed thematically in the following subchapters to gain a deeper understanding of this phenomenon.

A. Over-the-Counter (OTC) Medication Misuse Patterns

Identified patterns of OTC misuse include medication without medical indications, exceeding recommended dosages, long-term unsupervised use, and repeated use without regard for drug interactions. A study by Shudewa et al. (2023) identified that the majority of people self-medicate for efficiency and accessibility, despite awareness of potential side effects. This supports the Health Belief Model, which states that perceived benefits often outweigh perceived risks in determining health behaviors. Research by Smith et al. (2014) also demonstrated the clinical ineffectiveness of most OTC medications for acute cough, yet they continue to be widely used. This phenomenon is supported by the findings of Medisa et al. (2020), who found that the majority of information on OTC use came not from healthcare professionals, but from advertising and the media. This indicates a gap in drug risk communication between the health system and the public.

B. Factors Causing Misuse of OTC

Misuse of OTC drugs is influenced by various internal and external factors. Internally, low drug literacy and misperceptions about the safety of OTC drugs are the main causes. Indiani et al. (2023) found that college students are even influenced by trust in manufacturers and brand preferences, indicating that usage decisions are not always based on rational knowledge. Furthermore, a study by Sinuraya et al. (2023) confirmed that demographic factors such as education and location of residence also influence OTC use practices. Externally, weak regulation and pharmacist intervention in self-medication practices exacerbate the situation. Findings from Nasif et al. (2023) indicate that inappropriate recommendations from pharmacists persist, while a study by Al Mazrouei et al. (2021) demonstrated that pharmacist intervention in virtual services is lower than in-person interactions. This aligns with Social Cognitive Theory, which states that the social environment and service systems contribute to shaping individual health behaviors.

C. Solution Strategy: Education and Intervention System

Solutions to OTC misuse can be formulated through three main pillars: education, service system reform, and technology utilization. From an educational perspective, Ghinan Sholih et al. (2022) demonstrated that direct community education can increase understanding and reduce incorrect self-medication practices. A scoping review by F. Azzahra et al. (2024) also emphasized structured and inclusive education, particularly for herbal and OTC users. Systemic interventions, such as label redesign and product layout in pharmacies, have been shown to be effective in reducing misuse among the elderly population (Gilson et al., 2021). This demonstrates the importance of a design approach in managing OTC consumer behavior. Finally, digital-based solutions such as telepharmacy have received support from various parties. Ilma et al. (2024) and Fathorrahman et al. (2025) emphasize the crucial role of pharmacists in the digital space to provide education and mitigate the risks of OTC misuse more broadly and efficiently. Theoretically, the integration of risk communication theory, Diffusion of Innovation, and health behavior approaches is important to form adaptive and evidence-based strategies in educating the public and strengthening the role of pharmacists in monitoring the use of over-the-counter drugs.

CONCLUSION

The literature review shows that the misuse of over-the-counter (OTC) medications in the community is a widespread and complex problem. Common patterns of misuse include overuse, unintentional use, and unsupervised use by healthcare professionals. The causes are multifactorial, ranging from low drug literacy, misperceptions about the safety of OTC medications, the influence of advertising, to limited intervention by pharmacists. The most relevant and contextual solutions include public education, pharmacy system reform, and the use of telepharmacy and digital technology to improve monitoring and provide accurate information.

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