

Impact of Pharmacist-Led Education on Knowledge, Attitude, and Practice Regarding Over-the Counter Drugs Among the General Population: A Systematic Review

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ABSTRACT

The increasing reliance on over-the-counter (OTC) medications for self-treatment represents a significant public health concern, particularly in developing countries. While OTC drugs offer rapid symptom relief and help reduce the burden on healthcare systems, inappropriate self-medication can lead to adverse drug reactions, drug resistance, and suboptimal therapeutic outcomes. This systematic review aims to evaluate the knowledge, attitudes, and practices (KAP) related to OTC drug use among the general population, drawing insights from cross-sectional studies conducted in Saudi Arabia, India, Libya, the UAE, Indonesia, and Nigeria. The review also examines the potential role of pharmacist-led educational interventions in promoting safe medication practices. Eligible cross-sectional studies were identified, and key data were extracted and synthesized narratively to identify trends, common findings, and areas for targeted intervention. Findings consistently reveal widespread gaps in knowledge, misconceptions, and unsafe practices regarding OTC medications. These results underscore the urgent need for structured, pharmacist-led educational initiatives to improve responsible self-medication. Pharmacists are uniquely positioned to enhance medication literacy, mitigate risks associated with OTC drug use, and provide valuable support in regions with limited access to formal healthcare services.

Keywords- Self-medication, Over-the-counter drugs, Knowledge, Practice and Pharmacist education.

I. INTRODUCTION

Self-medication, defined as the selection and use of medications by individuals to address self-identified symptoms or illnesses without professional guidance, is a widespread practice globally ¹. The increasing availability and accessibility of over-the-counter (OTC) medications, particularly in developing countries, have contributed to a notable rise in self-medication across both urban and rural populations. While OTC drugs offer convenience and

reduce the burden on healthcare systems, improper self-medication poses significant public health risks, including adverse drug reactions, the masking of serious conditions, and the development of antimicrobial resistance ². According to the World Health Organization (WHO), responsible self-medication can optimize healthcare resource utilization, reduce costs, and empower individuals to manage minor ailments independently. However, its effectiveness largely depends on the public's ability to make informed choices regarding medication

use. Misuse or overuse of self-medication—especially antibiotics and analgesics—has been linked to increased health complications and the emergence of drug-resistant infections. Several factors influence self-medication behaviours, including socioeconomic status, education, cultural beliefs, prior illness experiences, access to medications, and perceptions of healthcare availability.

In low- and middle-income countries, barriers such as financial constraints, long wait times, and geographic inaccessibility often lead individuals to rely on pharmacies or local drug sellers as primary healthcare sources, frequently resulting in medications being dispensed without prescriptions. Although OTC medications are intended for safe use when taken as directed, research consistently shows that many individuals lack adequate knowledge regarding appropriate dosages, potential side effects, drug interactions, and contraindications. This knowledge gap can result in serious health consequences, such as hepatotoxicity from excessive paracetamol use and the development of antimicrobial resistance from inappropriate antibiotic consumption—an issue recognized globally by the WHO ³.

The Knowledge, Attitude, and Practice (KAP) framework is widely used to evaluate health behaviours, including OTC drug use. Within this model, “knowledge” encompasses awareness of medication indications, contraindications, dosage, and adverse effects; “attitude” reflects beliefs, trust in healthcare systems, and societal acceptance of self-medication; and “practice” refers to behaviours related to procuring, storing, and consuming medications. Assessing these components is crucial for designing interventions and policies that promote safe medication use. Empirical studies highlight widespread gaps in knowledge and unsafe self-medication practices worldwide. For instance, in Saudi Arabia, Almalki et al. reported that only 37% of participants had adequate understanding of proper self-medication, with many relying on guidance from friends and family rather than healthcare professionals ⁴. Similarly, in North India, Ahmad et al. observed that both urban and rural populations often relied on previous prescriptions or advice from pharmacists without current clinical evaluation ⁵. Comparable findings emerged from Libya and the UAE, where self-medication was common but awareness of potential adverse effects was limited ⁶⁻⁷. In Indonesia, Sinuraya et al. found frequent use of OTC analgesics with little attention to dosage instructions or side effects ⁸, while in Nigeria, Akande-Sholabi and Akinyemi documented high rates of antibiotic self-medication among young adults, emphasizing the role of community pharmacies in promoting safe practices. These findings collectively indicate a global pattern of inadequate knowledge and risky self-medication practices, despite widespread recognition of its convenience and cost-effectiveness ⁹.

Contributing factors include insufficient health education and permissive regulations on OTC sales. Pharmacists, given their accessibility and expertise in pharmacotherapy, are well-positioned to address these challenges. Pharmacist-led initiatives—such as counselling at points of sale, awareness campaigns, and community outreach—can enhance public understanding of medications, promote responsible self-care, and mitigate the risks associated with improper OTC drug use. Such interventions are vital in bridging the knowledge-practice gap and safeguarding public health.

II. METHODS

Literature Search:

An extensive and organized online literature search was performed using electronic databases such as PubMed, Scopus, MEDLINE, and Google Scholar. This search aimed to find cross-sectional studies released between 2018 and 2024 that examined the knowledge, attitudes, and practices (KAP) related to self-medication and over-the-counter (OTC) drug usage within the general population. The search criteria were limited to articles available in English and involving human subjects. The keywords utilized included: "Self-medication," "Over-the-counter drugs," "Knowledge, Attitude, and Practice," "Public medication behaviour," "Community pharmacy use," and "Pharmacist interventions in OTC use." Boolean operators AND and OR were employed to link the search terms. The reference lists of the selected articles were manually reviewed to identify any additional pertinent studies. The studies incorporated in this review were drawn from countries like: Saudi Arabia ^[1], India ^[2,4], Libya ^[3], UAE ^[5], Indonesia ^[6], and Nigeria ^[7].

Study Selection:

The initial screening of titles and abstracts was conducted independently by two reviewers to assess the relevance of each study. Studies were considered eligible if they: (1) employed a community-based cross-sectional design, (2) focused on knowledge, attitudes, and practices (KAP) regarding over-the-counter (OTC) drug use or self-medication, (3) involved general population groups of any age, and (4) were published in peer-reviewed journals between 2018 and 2024. Studies were excluded if they targeted only healthcare professionals or students, were not available in full text, or did not report primary data. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer. All studies meeting these criteria were included in the qualitative synthesis [1–7].

Data Extraction:

Two reviewers independently gathered relevant data using a standardized format. The information collected encompassed: the first author, year of publication, country, study setting, sample size, characteristics of participants, study design, and key

findings for each KAP domain. Data pertaining to sources of medication, the role of pharmacists, motivations for self-medication, and commonly used OTC drugs were also compiled. In the UAE and Nigeria, for example, most participants obtained OTC medications directly from community pharmacies ^[5,7], whereas in Libya, there was a common misunderstanding between OTC and prescription medications ^[3].

Data Synthesis:

Owing to the diversity in sample populations, differences in healthcare access across regions, and the variety of survey instruments employed in the included studies, a narrative synthesis approach was utilized to analyze the findings. The results were systematically organized into three primary domains: Knowledge, Attitudes, and Practices (KAP) related to over-the-counter (OTC) drug use and self-medication. Comparative analyses across different countries and population groups were conducted to identify patterns and trends, highlighting both challenges and positive perceptions associated with self-medication. The synthesis revealed consistent deficiencies in knowledge, including limited awareness of appropriate dosages, potential side effects, drug interactions, and contraindications. Misuse of medications, reliance on prior prescriptions, and misconceptions regarding safety were frequently reported. Despite these gaps, many individuals expressed favorable attitudes toward self-medication due to perceived convenience, autonomy in managing minor ailments, and reduced dependence on formal healthcare services. Analgesics and antibiotics emerged as the most commonly self-administered medications, particularly in studies from India, Indonesia, and Nigeria.

Additionally, research from the UAE, India, and Saudi Arabia underscored the largely untapped potential of pharmacists in promoting public health education. These studies highlighted that pharmacist-led interventions—such as counselling at community pharmacies, awareness campaigns, and structured educational programs—could effectively bridge knowledge gaps, correct misconceptions, and encourage safe self-medication practices. Overall, the narrative synthesis provided a comprehensive understanding of KAP patterns across diverse settings, emphasizing the critical role of pharmacists in mitigating risks associated with OTC drug use while supporting responsible self-care behaviours. Research from India, Indonesia, and Nigeria indicated that analgesics and antibiotics were the most frequently self-administered drugs ^[2,4,6,7]. The studies from the UAE, India, and Saudi Arabia investigated the role of pharmacists, highlighting their often-underused capabilities in public health education ^[1,2,5].

III. RESULT

The review focused on assessing the knowledge, attitudes, and practices (KAP) related to self-medication

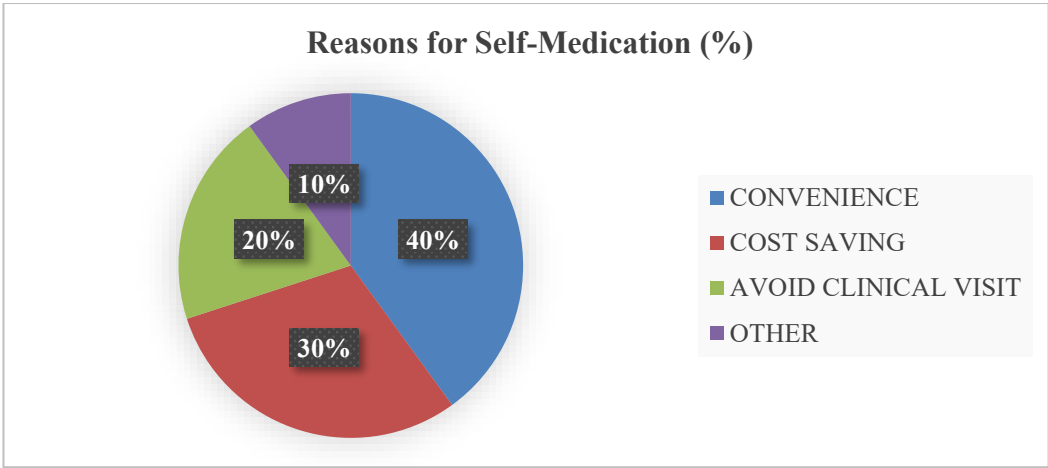
and over-the-counter (OTC) drug use among general population groups. Across all included studies, the total combined sample size was approximately 4,250 participants, with individual study cohorts ranging from 350 to 1,200 individuals ^[1–7].

Knowledge:

The included studies consistently highlighted substantial gaps in knowledge and comprehension of over-the-counter (OTC) medications among the general population. In Saudi Arabia, only 37% of respondents demonstrated accurate understanding regarding the safe use of OTC drugs, indicating widespread uncertainty about proper medication practices ¹. In India, although urban participants exhibited comparatively higher awareness than their rural counterparts, misconceptions and misinformation remained prevalent across both demographics, suggesting that access to healthcare resources alone did not fully address knowledge deficits ^{2,4}. Research from Libya and the United Arab Emirates further revealed that fewer than 40% of respondents possessed adequate understanding of critical aspects such as drug interactions, correct dosing, and the potential hazards associated with unsupervised antibiotic consumption ^{3,5}. In Indonesia, a striking 80% of users reported neglecting medication labels and package inserts, reflecting limited engagement with essential drug information ⁶. Similarly, in Nigeria, participants frequently confused brand names with their corresponding therapeutic indications, highlighting insufficient knowledge regarding medication purposes and the public health implications of inappropriate antibiotic use, particularly the emergence of antimicrobial resistance ⁷. Collectively, these findings underscore a global trend of inadequate knowledge about OTC medications, which poses significant risks to individual and community health and emphasizes the urgent need for structured educational interventions.

Attitude:

The studies revealed generally positive attitudes toward the use of over-the-counter (OTC) medications, primarily driven by perceptions of convenience, affordability, and prior personal experience. In Indonesia, 85% of respondents considered self-medication appropriate for minor ailments such as headaches or common colds ⁶. Participants in the United Arab Emirates expressed confidence in pharmacists' guidance, yet many also assumed that OTC medications were inherently safe, reflecting a lack of awareness regarding potential risks ⁵. In India and Nigeria, skepticism about the quality and accessibility of professional healthcare services contributed to a preference for self-treatment ^{2,7}. Across all studies, participants tended to underestimate or overlook the potential hazards associated with inappropriate medication use, particularly when symptoms persisted or worsened, highlighting a critical gap between perceived safety and actual risk.



Practice:

The review consistently reported high rates of over-the-counter (OTC) medication use across the included studies, accompanied by unsafe self-medication practices. In Libya, 78% of participants admitted to using antibiotics without a prescription within the past year ³. In India and Nigeria, individuals frequently relied on previous prescriptions or guidance from family and friends rather than consulting healthcare professionals ^{2,4,7}. Commonly observed unsafe practices across multiple studies included neglecting to verify medication expiration dates, sharing drugs with relatives or peers, reusing previously prescribed dosages for new or unrelated symptoms, and disregarding package inserts or warning labels. These behaviours reflect a widespread lack of adherence to safe medication practices, underscoring the need for targeted educational interventions to reduce potential health risks associated with improper OTC drug use ¹⁻⁷.

Table 1: Self-Medication Practices Observed

Practice	Reported Prevalence
Using previous prescriptions	65–70% [2,4,7]
Not consulting a pharmacist before purchase	55–60% [3,7]
Ignoring expiry date	~45% [1,4,5]
Sharing medications	~50% [2,3,6]
Not reading drug instructions	70–80% [5,6]

Role of Pharmacists:

Although pharmacists are often the first point of contact for individuals seeking over-the-counter (OTC) medications, their potential role as educators and advisors remains underutilized. In the United Arab Emirates, 62% of respondents obtained OTC drugs from pharmacies, yet only 28% reported receiving any form of counselling or guidance from pharmacy staff ⁵. In Saudi Arabia and India, pharmacists were largely passive in influencing patient behavior, with most individuals relying on

personal experience or advice from family and friends ¹⁻². Similarly, in Nigeria, nearly 70% of participants indicated that they had never received appropriate dosage instructions or safety information from pharmacy personnel ⁷. These findings underscore a significant opportunity for pharmacist-led educational interventions to improve knowledge, promote safe medication practices, and reduce the risks associated with improper OTC drug use.

IV. DISCUSSION

This systematic review compiles findings from studies conducted in a variety of geographical and cultural contexts—including Saudi Arabia, India, Libya, the UAE, Indonesia, and Nigeria—and emphasizes a shared public health issue: the prevalent but inadequately informed use of over-the-counter (OTC) drugs among the general population.

The review clearly indicates that there is a significant lack of understanding about OTC medication among the majority of the populations studied. Many participants frequently showed a deficiency in basic knowledge, including recommended dosages, drug interactions, contraindications, and possible side effects. For example, only 37% of survey participants in Saudi Arabia showed adequate awareness regarding the safe use of OTC drugs ^[1]. Similar deficiencies were observed in Libya and the UAE, where a large number of users were unaware that OTC medications could lead to harmful effects ^[3,5]. This lack of knowledge is concerning, especially given how easily these medications can be obtained in many areas without appropriate guidance or regulation.

Even so, the general perspective on self-medication tends to be favourable in all nations. Individuals view it as a practical, time-efficient, and economical approach to addressing minor health issues. In countries like Indonesia and India, most survey participants indicated that they favored self-medication as their initial reaction to typical symptoms ^[2,6].

Nevertheless, this positive view is not reflected in safe or evidence-supported practices.

Self-medication practices frequently posed dangers and were often improperly conducted. There were significant levels of antibiotic misuse noted in both Libya and Nigeria ^[3,7], and many individuals acknowledged sharing unused medications, relying on outdated prescriptions, or neglecting to verify expiration dates. In India, both urban and rural communities indicated a lack of attention to reading medication leaflets or seeking advice from healthcare providers prior to use ^[2,4].

One of the most troubling issues is the underuse of pharmacists, who are frequently the most readily available healthcare professionals in numerous communities. In many cases, pharmacists were either completely overlooked or only involved in dispensing medications, with very little counselling offered in most environments. In the UAE, while pharmacies served as a key resource for medications, only a small fraction of customers received adequate guidance on proper usage ^[5]. This lost opportunity to educate and assist the public highlights the necessity for greater pharmacist participation in public health initiatives and improving medication literacy.

In light of these findings, this review supports the urgent implementation of pharmacist-led educational interventions. These may include point-of-sale counselling, public health campaigns, and collaboration with local health authorities to ensure safe medication use. Additionally, policy-level changes-such as stricter OTC regulations, public awareness programs, and integration of KAP education into community outreach-are essential to address knowledge deficits and reshape attitudes and practices around self-medication.

V. CONCLUSIONS

Pharmacist-led educational interventions have a significant potential to improve the knowledge, attitudes, and practices of the general population regarding over-the-counter (OTC) medications. By providing accurate information, counselling, and guidance, pharmacists can reduce unsafe self-medication behaviours, enhance responsible drug use, and contribute to better public health outcomes. Structured and accessible educational programs, supported by policymakers and community initiatives, are essential to maximize the impact of these interventions.

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