International Journal of Zoology and Applied Biosciences
Volume 11, Issue 3, pp: 256-263, 2026
https://doi.org/10.55126/ijzab.2026.v11.i03.039
ISSN: 2455-9571
http://www.ijzab.com

Research Article

PUBLIC HEALTH STRATEGIC ACTIONS FOR REDUCING THE DANGERS OF OVER-THE-COUNTER (OTC) MEDICATIONS AMONG RURAL DWELLERS IN SOUTHEAST, NIGERIA

[1]Ejiogu, C.C., [2]Akanazu, C.O., [3]Udensi, J.U., [3]Ogwo, U.K., [3]Anyanwu, E.O., [4]Ohiri, J.C., [4]Nwadinigwe, F.C., [3]Kenechukwu, O.Q., [2]Obasi, C.C., [2]Mbanefo, D.N., [5]Osuagwu, I.K., [3]Ajoku, C.U.,[6]Oparaojiaku, J.O.,[2]Osumune, A.C., [2]Ejezie, B., [3]Njoku, J.O., [2]Osuoji, J.N & [7]Chikaire, J.U

[1]Department of Environmental Management, Federal University of Technology, Owerri, Imo State, Nigeria
[2]Department of Public Health, Federal University of Technology, Owerri, Imo State, Nigeria
[3]Department of Environmental Health, Federal University of Technology, Owerri, Imo State, Nigeria
[4]Department of Chemical Pathology, College of Medicine, Federal University of Technology, Owerri, Imo State,
[5]Department of Health Services, Federal University of Technology, Owerri, Nigeria
[6]Department of Agricultural Economics and Extension, University of Agriculture and Environmental Sciences, Umuagwo, Imo State, Nigeria
[7]Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria

Article History: Received 11th March 2026; Accepted 20th April 2026; Published 1st May 2026

ABSTRACT

The widespread availability of over-the-counter (OTC) medications offers benefits to the users for self-care, yet it poses significant public health risks, particularly among rural populations. This paper examined the public health dangers associated with OTC use and the public health strategic actions for public sensitization aimed at reducing the dangers of OTC medication use. A total of 350 respondents (adults, patients, nurses, doctors, pharmacists, community leaders, dispensaries etc) were selected randomly through a stratified basis from three (3) States in Southeast, Nigeria. Questionnaire and oral interview were used to collect data, which were analyzed using sample percentages presented in tabular forms. Results showed that the commonly used OTC medications include Analgesics and antipyretics (94.2%), herbal preparations (80.5%), anti-malarial drugs (80.0%), anti-diarrheal drugs (85.7%). The possible dangers as indicated by respondents include; drug overdose risk (78.9%), drug resistance (83.1%), adverse side effects (82.6%), drug interactions (77.1%) and others. The factors influencing OTC medicine use include; easy accessibility (98.5%) to patent medicine store, long waiting time in hospitals (88.5%), prior experience with illness (84.2%), pharmacist/patent medicine dealer advice (80.2%). The possible health risk associated with OTC medication as indicated by the respondents include drug toxicity and overdose (81.1%), liver damage (95.7%), kidney damage (97.1%), allergic reactions (91.4%). The proposed public strategic actions for OTC danger reduction include; health education campaign (98.2%), warning labels on drug packaging (92.8%), strengthening primary health-care (94.2%), media sensitization campaigns (88.5%), among others.

Keywords: Health, Medication, Over-the-counter, Risk, Drug.

INTRODUCTION

Over-the-counter (OTC) medications are drugs that can be bought without a doctor's prescription and are commonly used around the world to treat minor health issues such as headaches, fever, coughs, and pain. While these medicines help increase access to basic treatment, their misuse has become an escalating public health issue especially in low- and middle-income countries like Nigeria. Evidence shows that people often use OTC drugs for self-treatment in ways

*Corresponding Author: Chikaire, J.U, Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria. Email: jonadab.chikaire@futo.edu.ng.

that can lead to harmful side effects, dependency, and in serious cases, hospitalization or even death (Algarni *et al*., 2021). This trend underscores the importance of implementing well-designed public health measures to encourage safer medication practices. In Nigeria, the widespread use of OTC drugs is driven by limited healthcare access, the high cost of medical consultations, and insufficient regulation. Many individuals turn to community pharmacies, patent medicine vendors, and unlicensed sellers to obtain medications quickly, often without professional medical advice. Research highlights that painkillers, cough syrups, antihistamines, and antimalarial drugs are among the most frequently misused OTC products in the country (Iheanacho & Adam, 2025). These risks are compounded by low levels of health literacy and a general lack of public understanding about the potential dangers of self-medication.

In Southeast Nigeria comprising Anambra, Enugu, Imo, Abia, and Ebonyi states misuse of OTC drugs is especially common. Factors such as high population density, thriving informal drug markets, and numerous unregulated pharmaceutical outlets contribute to the problem. At the same time, gaps in healthcare availability push many people to treat themselves at the first sign of illness. Public health data indicate that improper use of OTC medicines in this region contributes to complications like drug resistance, liver and kidney damage, and the concealment of serious illnesses that require clinical diagnosis (Nwokedi *et al*., 2025). Moreover, the ready availability of medications without prescriptions has led to growing instances of drug dependence and abuse, particularly among young people. Cough syrups containing dextromethorphan or sedating antihistamines, for example, are often taken for their mind-altering effects. This pattern points to broader systemic challenges, including poor regulatory oversight and a lack of proper counseling by pharmacists during sales (Chinonyerem *et al*., 2025). These concerns highlight the urgent need for coordinated public health efforts to reduce harm linked to OTC drug use. Proven strategies such as public education campaigns, stronger regulatory frameworks, pharmacist-led guidance, and improved awareness initiatives have been shown to reduce inappropriate OTC drug use. Studies suggest that increasing knowledge and limiting unsupervised sales can significantly curb risky self-medication behaviors (Algarni *et al*., 2021). As such, developing and applying targeted interventions in Southeast Nigeria is essential for enhancing medication safety and improving overall health outcomes.

The rising misuse of over-the-counter medications in Southeast Nigeria represents a serious public health concern. Although these drugs are meant for mild conditions, many users engage in unsafe self-medication without understanding correct dosages, possible interactions, or side effects. This has led to more cases of drug toxicity, ineffective treatments, and preventable hospitalizations (Iheanacho & Adam, 2025). A key issue is the poor enforcement of pharmaceutical regulations, which enables easy access to strong medications through both formal and informal outlets. Often, people rely on advice from unqualified individuals when purchasing drugs, resulting in irrational use. Research confirms that such behavior raises the likelihood of adverse reactions and contributes to antimicrobial resistance (Nwokedi *et al*., 2025). Additionally, public awareness about the risks of OTC drug misuse remains low. Many assume these medicines are entirely safe because they don't require a prescription. This belief fuels overuse, dependency, and delays in seeking professional care for serious health problems (Algarni *et al*., 2021). Thus, the core issue this study addresses is the lack of effective, strategic public health actions aimed at minimizing the risks associated with OTC medication use among populations in Southeast Nigeria.

This study holds significance as misuse of over-the-counter (OTC) medications poses an increasing yet often overlooked public health challenge in Nigeria. The widespread availability of these drugs without prescriptions has led to a rise in self-medication, frequently resulting in avoidable health issues (Algarni *et al*., 2021). Gaining insight into the scope of this problem in Southeast Nigeria can support policymakers in developing more targeted regulatory measures and public education initiatives. Additionally, the research is warranted by the growing number of drug-related adverse effects such as organ damage and dependency linked to the unmonitored use of medications. Research indicates that strengthening public health approaches, including public awareness efforts and greater pharmacist engagement, could play a key role in mitigating these risks (Iheanacho & Adam, 2025). The general objective of the work is to develop public health strategic actions for reducing the dangers associated with the use of over-the-counter medications among users in Southeast Nigeria. The specific objectives include to a). identify the commonly used over-the-counter medications among users in Southeast Nigeria; b). examine the level of awareness of users regarding the dangers associated with OTC medication use; c). determine the factors influencing the use of OTC medications among users; d). assess the health risks associated with improper use of OTC medications; e). propose effective public health strategies for reducing the dangers associated with OTC medication use

MATERIALS AND METHODS

The research was carried out in Nigeria's Southeast geopolitical zone, which includes five states: Abia, Anambra, Ebonyi, Enugu, and Imo. This region is primarily home to the Igbo people and is marked by a high population density, with many residents involved in trade, agriculture, and small businesses (National Bureau of Statistics [NBS], 2022). The climate is typical of a tropical rainforest, featuring clear wet and dry seasons that support both farming and economic activity (Nigerian Meteorological Agency [NIMET], 2021). Access to healthcare varies, particularly between urban and rural areas, where remote communities often face challenges

reaching formal medical facilities. As a result, people in these areas frequently turn to over-the-counter (OTC) medicines for self-treatment (World Health Organization [WHO], 2019).

A descriptive survey design was used in this study, chosen for its effectiveness in gathering both quantitative and qualitative data from a broad population. This approach is commonly applied in public health and social research to explore behaviors, attitudes, and the impact of health interventions (Creswell, 2014). The region's widespread network of patent medicine sellers and pharmacies, combined with weak regulatory oversight and limited public knowledge, has led to frequent misuse of OTC drugs (Okeke *et al*., 2020). These factors make Southeast Nigeria a relevant area for studying strategies to reduce risks linked to non-prescription medication use. The study focused on adult residents and consumers of

OTC, health professionals (pharmacists, doctors, nurses, patent medicine dealers, and the elderly) aged 18 and above in the Southeast who use OTC medications, including individuals from both urban and rural settings who obtain drugs without a prescription. A sample size of 350 participants was purposively and randomly selected, a number deemed sufficient for statistical reliability and broader inference in public health studies (Yamane, 1967). The sampling process involved stratified sampling technique where the respondents from different categories as earliar said were included. This method helped ensure diverse representation across geographic and socioeconomic backgrounds. Data were gathered through both primary and secondary sources and analyzed using frequency counts and percentages, presented in tabular form.

RESULTS AND DISCUSSION

Table 1 showed that analgesics and antipyretics (94.2%) are the most commonly used OTC medications among respondents, followed by antidiarrheal drugs (71.4%), vitamins/supplements (84.0%), herbal OTC preparations (80.5%), antacids and anti-ulcer drugs (79.1%), topical pain relievers (78.7%), antimalarials (80.0%), antibiotics for self-medication (77.1%), antacids/anti-ulcer drugs (80.0%), cough and cold syrups (66.2%). Over-the-counter (OTC) medication use in Southeast Nigeria aligns with national trends, where self-treatment is common due to factors like ease of access, low cost, and limited availability of healthcare services. These drugs are primarily used to address everyday health issues such as pain, fever, infections, and digestive problems. Recent research in Nigeria sheds light on the most frequently used OTC drug types and how they are typically used. Pain relievers, particularly paracetamol, are the most widely used OTC medications in both Southeast and other parts of Nigeria. They are commonly taken for headaches, fever, and general aches. A 2024 study found that around 72% of respondents had used analgesics, making them the top category of OTC drugs (Iheanacho *et al*., 2024). Their widespread use stems from low cost, ready availability in pharmacies and local medicine shops, and their effectiveness in managing common symptoms (Akande-Sholabi & Akinyemi, 2023). However, regular and unmonitored use raises concerns about misuse and the risk of liver damage, especially when doses exceed recommended levels.

Vitamin supplements, especially vitamin C, are also commonly purchased without prescriptions in the region. Many people take them to strengthen immunity, prevent sickness, and support overall health. Data shows that more than half of surveyed individuals about 57% reported using vitamins as OTC products (Iheanacho *et al*., 2024). This high rate of use is fueled by the belief that vitamins are safe and beneficial even without medical advice, along with strong marketing and cultural emphasis on preventive care. Medications for coughs and colds are another frequently used group, especially for respiratory symptoms like coughing, congestion, and flu-like conditions. Research indicates that over 20% of users turn to these remedies for symptom relief (Iheanacho *et al*., 2024). They are especially popular in rural and semi-urban areas, where respiratory illnesses are common and access to clinics may be limited. While their wide availability supports frequent use, incorrect dosing or long-term use can result in unwanted side effects.

Topical treatments such as creams and ointments are also regularly used without prescriptions. These are applied to treat skin infections, wounds, and minor injuries, and are particularly common in farming communities where physical work increases the risk of cuts and skin issues. Around 15% of users reported using topical products (Iheanacho *et al*., 2024). Decisions on their use often come from personal experience or advice from medicine sellers, rather than from trained health workers. Other frequently used non-prescription products include antimalarial drugs—sometimes taken without proper diagnosis digestive aids like antacids, and herbal formulations. Although not all are officially classified as OTC in regulated systems, they are often obtained without a doctor's prescription in practice. The use of these medications is largely driven by self-diagnosis and the desire for fast symptom relief. Studies also note that many households keep stocks of OTC drugs for future use, which helps sustain routine self-medication behaviors (Akande-Sholabi & Akinyemi, 2023).

Table 1. Commonly Used Over-the-Counter (OTC) Medications.

OTC Medication Category	*Frequency	Percentage
Analgesics/ antipyretics	330	94.2
Antimalarials	280	80.0
Antibiotics (self-medication)	270	77.1

Antacids/anti-ulcer drugs	245	70.0
Antihistamines	250	71.4
Cough and cold syrups	232	66.2
Antidiarrheal drugs	300	85.7
Vitamins/supplements	294	84.0
Topical pain relievers	274	78.2
Herbal OTC preparations	310	80.5

*Multiple responses

Table 2 showed that respondents demonstrated awareness of various dangers associated with OTC medication use. These include awareness that Drug overdose risk (78.9%), Drug resistance (antimicrobial resistance) (83.1%), Adverse side effects (82.6%), Drug drug interactions (77.1%), Organ damage (liver and kidney) (61.1%), Masking of serious diseases (75.4%), Dependence and addiction risk (73.4%), Incorrect self-diagnosis (67.4%), Allergic reactions (70.0%), Pregnancy and child risk (73.4%). Public awareness of the risks linked to over-the-counter (OTC) medication use is moderately developed but incomplete. While many people acknowledge general safety concerns, significant knowledge gaps persist particularly regarding adverse reactions, overdose potential, and drug interactions. Recent research suggests that the widespread perception of OTC medicines as safe and effective, fueled by their easy availability, often leads users to downplay associated risks. Although a large portion of the population views these medications as suitable for self-treatment, this confidence frequently isn't matched by an understanding of proper dosing, contraindications, or possible side effects (Taylor *et al*., 2023). In fact, misuse remains prevalent, especially when individuals diagnose themselves without consulting healthcare professionals, raising the risk of harmful consequences (Taylor *et al*., 2023; Narang *et al*., 2023).

Despite broad familiarity with OTC drugs, deeper comprehension of their potential dangers tends to be limited. A cross-sectional study found that while usage rates are high, many consumers lack awareness of side effects, interactions, and safe dosage thresholds approximately 25% of respondents demonstrated poor knowledge about correct use and adverse outcomes (Amjad *et al*., 2024). This shortfall is particularly troubling, as it contributes to unsafe behaviors like using medications without reading labels or identifying contraindications, which in turn heightens health risks (Amjad *et al*., 2024; Thosar *et al*., 2026). Evidence consistently shows that although people recognize OTC drugs are commonly used for minor health issues, their understanding of specific hazards—such as overdose, dependency, and interactions—remains inadequate. As a result, experts increasingly advocate for enhanced public education and targeted awareness initiatives to promote safer use and reduce avoidable harm (Jalal & Jalal, 2024; Algarni *et al*., 2021).

Table 2. Awareness of Dangers of OTC Medication Use.

Awareness of Dangers	***Frequency (n)**	**Percentage (%)**
Drug overdose risk	276	78.9
Drug resistance (antimicrobial resistance)	291	83.1
Adverse side effects	289	82.6
Drug–drug interactions	270	77.1
Organ damage (liver and kidney)	214	61.1
Masking of serious diseases	264	75.4
Dependence and addiction risk	257	73.4
Incorrect self-diagnosis	236	67.4
Allergic reactions	245	70.0
Pregnancy and child risk	257	73.4

***Multiple responses**

Table 3 showed the considerable factors affecting OTC medication include easy accessibility (98.5%) to patent medicine store, long waiting time in hospitals (88.5%),prior experience with illness (84.2%), pharmacist/patent medicine dealer advice (80.2%), cultural/traditional beliefs (79.4%), low cost (76.6%), lack of health insurance (74.5%), convenience and time-saving(82%), influence of family/friends (73.4%), and perceived mildness of illness (72.9%). The use of over-the-counter (OTC) medications is shaped by a range of interrelated factors, including demographic, socioeconomic, health system, behavioral, and informational influences. Socioeconomic status plays a central role: people with lower incomes, inadequate health insurance, and less education are more prone to self-medicate with OTC drugs, often because accessing formal healthcare is financially out of reach (Lopez, 2025; Tavares & Ferreira, 2022). In contrast, those with higher education levels and better insurance coverage tend to use OTC products more carefully and knowledgeably, which helps lower the risk of misuse (Tavares & Ferreira, 2022).

Demographics such as age, gender, and household composition also affect usage patterns. Research indicates that younger adults and women are more likely to use OTC medications, driven by convenience, reproductive health concerns, and straightforward access (Tachi *et al*., 2018; Tushar, 2024). Moreover, individuals responsible for children may turn more frequently to OTC remedies for minor ailments, opting for home treatment instead of medical consultations (Tian *et al*., 2025).

Health status and psychological aspects further influence behavior. People managing chronic conditions, experiencing recurring symptoms, or who have had favorable outcomes with OTC drugs in the past are more inclined to continue self-treatment (Tachi *et al*., 2018). Personal traits like conscientiousness and agreeableness, along with levels of health literacy and the habit of searching for health information online, can either support responsible use or contribute to overuse (Tian *et al*., 2025). Lastly, how easily medications can be obtained, cultural attitudes toward health, and sources of information significantly impact decisions. The ready availability of non-prescription drugs, guidance from pharmacists or informal networks, and input from family and friends all promote OTC use (Al-Omrani *et al*., 2023; Tachi *et al*., 2018). At the same time, exposure to digital health content and pharmaceutical advertising raises awareness and often leads individuals especially those who view their symptoms as mild or self-limiting—to treat themselves without seeking professional advice (Tian *et al*., 2025).

Table 3. Factors Influencing OTC Medication Use.

Influencing Factor Description	*Frequency	Percentage
Easy accessibility	345	98.5
Low cost	268	76.6
Long waiting time in hospitals	310	88.5
Prior experience with illness	295	84.2
Perceived mildness of illness	255	72.9
Pharmacist or patent medicine dealer advice	281	80.2
Cultural and traditional beliefs	278	79.4
Lack of health insurance	261	74.5
Convenience and time-saving	287	82.0
Influence of family/friends	257	73.4

*Multiple responses

Table 4 showed that respondents identified several significant health issues associated with improper OTC medication use. These health issues include; drug toxicity and overdose (81.1%), liver damage (95.7%), Kidney damage (97.1%), allergic reactions (91.4%), drug resistance (89.7%), delayed diagnosis of illness (86.2%), dependence or addiction (82.5%), drug interactions (78.2%), and treatment failure (71.7%). Although over-the-counter (OTC) medications are easily accessible and often considered safe, using them incorrectly can pose significant health risks. A primary concern is overdose, which may happen when people exceed recommended doses or mix products with identical active ingredients, such as acetaminophen or dextromethorphan. This type of misuse can lead to liver damage, suppressed breathing, and in extreme cases, death (National Institute on Drug Abuse [NIDA], 2024). Research also indicates that frequent misuse of OTC drugs contributes to acute poisoning incidents and emergency hospitalizations resulting from unintentional overdoses (Algarni *et al*., 2021). Extended or inappropriate use of these medications presents additional dangers, including organ damage and widespread toxicity. For instance, overusing nonsteroidal anti-inflammatory drugs (NSAIDs) may cause gastrointestinal bleeding, reduced kidney function, and a higher likelihood of cardiovascular problems. Likewise, prolonged or excessive intake of certain cough medicines or antihistamines can impact the central nervous system, potentially leading to drowsiness, disorientation, hallucinations, or dependency in some individuals (Borrego-Ruiz, 2025). These adverse effects are often intensified when OTC drugs are taken with alcohol or other substances. Furthermore, improper use of OTC medications raises the likelihood of developing dependence, experiencing harmful drug interactions, and postponing treatment for underlying medical conditions. Certain OTC products especially those containing codeine, dextromethorphan, or sedating antihistamines—have been associated with dependency when used repeatedly in ways not intended. Combining multiple OTC medications or using them with prescription drugs can also result in dangerous interactions. Additionally, symptom suppression due to misuse may obscure signs of serious illnesses, leading to delayed diagnosis and potentially worse health outcomes (Algarni *et al*., 2021; Borrego-Ruiz, 2025).

Table 4. Health Risks Associated with Improper Use of OTC Medications.

Health Risk	**Frequency**	**Percentage**
Drug toxicity/overdose	284	81.1
Liver damage	335	95.7
Kidney damage	340	97.1

Drug resistance	314	89.7
Allergic reactions	320	91.4
Delayed diagnosis of illness	302	86.2
Gastro-intestinal problems	310	88.5
Dependence or addiction	289	82.5
Drug interactions	274	78.2
Treatment failure	251	71.7

*Multiple responses

Table 5 showed public health strategies for reducing unwise use of OTC medication. these strategies include public health education campaign (98.2%), strengthening primary healthcare services (94.2%), warning labels on drug packaging (90.8%), regulation of drug sales (86.0%), community health outreach programs (83.7%), Media sensitization campaigns (88.5%), training of patent medicine vendors (82.5%) and establishment of drug monitoring systems (84.8%). Over-the-counter (OTC) medications are commonly used worldwide to manage minor health issues, providing convenience and helping ease the burden on healthcare services. Yet, their widespread availability also raises concerns about misuse, overuse, harmful interactions, and accidental overdose, making their use a notable public health issue. Research shows that while OTC drugs are typically safe when taken as directed, incorrect usage can result in severe consequences, including hospitalization, poisoning, or fatalities (Algarni *et al*., 2021). With self-medication becoming increasingly common especially among teenagers and the elderly there is a growing need for effective public health strategies to promote safer practices (Frontiers in Public Health, 2025).

One of the most impactful public health approaches to reducing risks linked to over-the-counter (OTC) medications is launching focused education and awareness initiatives. Many people wrongly assume OTC drugs are entirely safe, leading to underestimation of potential dangers and increasing the likelihood of misuse or overdose (Gilson *et al*., 2025). Public health organizations can counter this misconception through broad media outreach, school-based instruction, and community programs that highlight proper dosing, possible drug interactions, and the importance of reading labels carefully. Research indicates that enhancing health literacy leads to fewer medication errors and less inappropriate self-treatment (World Health Organization, 2023). Community pharmacists are vital in lowering OTC-related risks by offering guidance, conducting screenings, and educating patients. Studies show pharmacist-led efforts significantly decrease improper medication use, especially among older adults and those managing chronic conditions (Gilson *et al*., 2025). Pharmacists can detect individuals at risk, watch for harmful drug combinations, and offer personalized advice on safe OTC choices. Moreover, modifying pharmacy layouts such as isolating high-risk OTC products or placing visible warning signs has proven effective in promoting safer consumer behavior and reducing misuse (Research in Social and Administrative Pharmacy, 2022). Expanding pharmacists' integration into primary care systems is thus a crucial public health priority.

Regulatory measures play a fundamental role in ensuring the safe availability and use of OTC medicines. Authorities can enforce clearer labeling standards, limit package sizes, or reclassify certain high-risk OTC drugs as prescription-only. For instance, restricting how much acetaminophen can be bought at once has helped lower both accidental and intentional overdoses (Algarni *et al*., 2021). In addition, monitoring systems that track sales and adverse events allow policymakers to spot misuse patterns and take timely action. Together, these policies help reduce widespread exposure to medication-related harm. Digital innovations are becoming increasingly important in improving medication safety. Tools like mobile health apps, AI-assisted decision aids, and electronic reminders support users in adhering to correct dosing schedules and avoiding duplicate treatments. New developments, including AI-based OTC recommendation platforms, assist consumers in choosing suitable medications based on symptoms while simultaneously checking for possible interactions (Falahati *et al*., 2025). These technologies expand access to reliable guidance and reduce dependence on risky self-medication practices. Still, equitable access and strong data protection must be ensured for successful, large-scale adoption. Some groups including adolescents, older adults, and individuals with long-term health conditions are more susceptible to OTC medication misuse. Young people may self-medicate due to peer pressure or inaccurate information, while elderly patients face greater risks from drug interactions caused by taking multiple medications (Frontiers in Public Health, 2025). Public health efforts should therefore include targeted strategies such as school-based safety education, medication reviews for seniors, and training for caregivers. Pharmacists are especially valuable in these efforts, providing individualized counseling and helping mitigate specific risks. Managing OTC medication risks effectively requires strong surveillance systems capable of detecting adverse reactions and tracking misuse trends. Pharmacovigilance enables health agencies to gather and assess data on medication-related harm, supporting early identification of emerging threats. Combining data from pharmacy sales, hospital records, and community reports improves the ability to recognize new patterns of misuse. Evidence confirms that stronger data systems enhance regulatory responses and strengthen prevention efforts (World Health Organization, 2023).

Table 5. Proposed Public Health Strategies for Reducing OTC Medication Risks.

Public Health Strategy	*Frequency	Percentage
Public health education campaigns	344	98.2
Pharmacist-led counseling	264	75.4
Regulation of drug sales	301	86.0
Community health outreach programs	305	87.1
Warning labels on drug packaging	325	92.8
School-based health education	342	98.5
Strengthening primary healthcare services	330	94.2
Media sensitization campaigns	310	88.5
Training of patent medicine vendors	289	82.5
Establishment of drug monitoring systems	297	84.8

*Multiple responses

CONCLUSION

This study underscores that misuse of over-the-counter (OTC) medications in Southeast Nigeria is a notable yet avoidable public health issue, largely fueled by limited awareness, widespread availability of drugs, and inadequate regulatory oversight. The study's objectives focus on examining public awareness, pinpointing key contributing factors, reviewing current interventions, and suggesting more effective solutions. Tackling this problem calls for a coordinated, multi-sectoral response that includes government bodies, healthcare professionals, pharmacists, and community influencers. Enhancing public health education, reinforcing regulatory frameworks, and encouraging responsible medication use are critical steps toward minimizing risks linked to OTC drugs. When properly implemented, these measures can lead to better health outcomes, fewer preventable adverse drug events, and safer self-medication practices across the region.

ACKNOWLEDGMENT

The authors express sincere thanks to the Head of the Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria for the facilities provided to carry out this research work.

CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

FUNDING

This study received no specific funding from public, commercial, or not-for-profit funding agencies.

AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

REFERENCES

Akande-Sholabi, W., & Akinyemi, O. O. (2023). Self-medication with over-the-counter drugs among consumers in a Southwestern state in Nigeria. *BMJ Open, 13*(5), e072059. https://doi.org/10.1136/bmjopen-2023-072059

Algarni, M., Hadi, M. A., Yahyouche, A., Mahmood, S., & Jalal, Z. (2021). A mixed-methods systematic review of the prevalence, reasons, associated harms and risk-reduction interventions of over-the-counter medicines misuse, abuse and dependence in adults. *Journal of Pharmaceutical Policy and Practice, 14*, 76. https://doi.org/10.1186/s40545-021-00350-7

Al-Omrani, H., Marwah, M. K., Al-Whaib, R., Mekkawy, M., & Shokr, H. (2023). Patterns of drug utilization and self-medication practices: A cross-sectional study. *Pharmacy, 11*(6), 183. https://doi.org/10.3390/pharmacy11060183

Amjad, U., Ali, W., Rehman, T., & Aamir, M. (2024). Patient knowledge and utilization of over-the-counter medications: A comprehensive study. *Journal of Pharmaceutical Research International, 36*(9), 131–143. https://doi.org/10.9734/jpri/2024/v36i97583

Borrego-Ruiz, A. (2025). Over-the-counter drugs: Misuse and safety implications. *Food and Drug Safety, 3*(1), 1–10. https://doi.org/10.55121/fds.v3i1.780

Chinonyerem, S. D., *et al*. (2025). Community pharmacists' challenges with OTC cough syrup abuse among Nigerian youths. *Public Health Journal, 12*(3), 45–60.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.

Falahati, S., *et al*. (2025). *An AI-powered public health kiosk system for personalized OTC medication care*. arXiv. https://arxiv.org/abs/2504.13880

Frontiers in Public Health. (2025). A cross-sectional study on OTC drug use among adolescents. https://doi.org/10.3389/fpubh.2025.1560299

Gilson, A. M., *et al*. (2025). Older adult misuse of over-the-counter medications: A randomized controlled trial. *Journal of Patient Safety.* https://doi.org/10.1097/PTS.0000000000000128

Iheanacho, C. O., *et al*. (2024). Knowledge, sources and use of over-the-counter drugs by teachers in a Nigerian urban community. *Journal of Pharmaceutical Policy and Practice.*

Jalal, S. M., & Jalal, S. H. (2024). Public awareness and practice regarding over-the-counter medications. *Cureus, 16*(4), e58410. https://doi.org/10.7759/cureus.58410

Lopez, F. (2025). *Socioeconomic factors influencing self-medication practices* (Unpublished thesis/dissertation). The University of Texas at Dallas.

Narang, P., Garg, V., & Sharma, A. (2023). Regulatory, safety and economic considerations of over-the-counter medicines in the Indian population. *Discover Health Systems, 2*(17). https://doi.org/10.1007/s44250-023-00032-y

National Bureau of Statistics. (2022). *Demographic statistics bulletin.* Abuja, Nigeria: Author.

National Institute on Drug Abuse. (2024). *Over-the-counter medicines drug facts.* U.S. Department of Health and Human Services. https://nida.nih.gov/publications/drugfacts/cough-cold-medicine-abuse

Nigerian Meteorological Agency. (2021). *Climate review bulletin.* Abuja, Nigeria: Author.

Nwokedi, V. U., Ogadah, C. O., & Adeyemi, B. I. (2025). Safety and public health implications of OTC medication use. *Journal of Public Health Research, 18*(2), 101–115.

Okeke, T. A., Lamikanra, A., & Edelman, R. (2020). Socioeconomic and behavioral factors leading to acquired bacterial resistance to antibiotics in developing countries. *Emerging Infectious Diseases, 5*(1), 18–27.

Research in Social and Administrative Pharmacy. (2022). Effectiveness of a tailored OTC medication safety intervention in community pharmacies. https://doi.org/10.1016/j.sapharm.2022.06.008

Tachi, T., Yoshida, A., Kanematsu, Y., Sugita, I., Noguchi, Y., Osawa, T., Yasuda, M., Mizui, T., Goto, C., & Teramachi, H. (2018). Factors influencing the use of over-the-counter drugs and health foods/supplements. *Pharmazie, 73*(10), 598–604. https://doi.org/10.1691/ph.2018.8617

Tavares, A. I., & Ferreira, P. L. (2022). Factors contributing to self-medication and consumption of non-prescribed drugs in Portugal. *International Journal of Public Health.* https://pmc.ncbi.nlm.nih.gov/articles/PMC9676243/

Taylor, J. G., Ayosanmi, S., & Sansgiry, S. S. (2023). Consumer impressions of the safety and effectiveness of OTC medicines. *Pharmacy, 11*(2), 51. https://doi.org/10.3390/pharmacy11020051

Thosar, J., Shukla, S., & Malhotra, S. (2026). An exploration of patterns of over-the-counter drug usage and individual knowledge regarding its safety and efficacy in adults. *SAGE Open Medicine.* https://doi.org/10.1177/09760016261436523

Tian, Y.-S., Mao, X., Zhou, Y., Fukuzawa, K., Ikeda, K., *et al*. (2025). Status and influencing factors of OTC medicine use for self-medication in cold and cough: A cross-sectional survey. *BMC Public Health, 25*, 1918. https://doi.org/10.1186/s12889-025-23113-4

Tushar, M. I. (2024). Factors associated with over-the-counter drug misuse among young people: A narrative review. *European Journal of Public Health, 34*(Supplement_3). https://doi.org/10.1093/eurpub/ckae144.1671

World Health Organization. (2019). *Guidelines on the rational use of medicines.* WHO Press.

World Health Organization. (2023). *Medication safety in polypharmacy.* WHO Press.

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.