STM JOURNALS

International Journal of
Tropical Medicines

https://journals.stmjournals.com/ijtm

ISSN: 3048-6262
Volume 3, Issue 2, 2026
July—December
DOI (Journal): 10.37591/IJTM

Review IJTM

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Drug Marketing in Tropical Regions and Its Effect on Pharmacovigilance Awareness and Reporting

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Abstract

Drug marketing practices in tropical regions present a complex interplay between pharmaceutical promotion, healthcare infrastructure limitations, and public health outcomes. These regions – characterized by high disease burden, socio-economic disparities, and diverse healthcare delivery systems – often experience unique challenges in ensuring safe and rational drug use. Aggressive and sometimes unregulated marketing strategies by pharmaceutical companies may significantly influence prescribing behavior, patient compliance, and, ultimately, pharmacovigilance systems. Pharmacovigilance, defined as the science and activities related to the detection, assessment, understanding, and prevention of adverse drug reactions (ADRs), is crucial for ensuring drug safety post-marketing. However, in tropical regions, pharmacovigilance awareness and reporting remain suboptimal due to factors such as inadequate training, poor regulatory enforcement, lack of infrastructure, and limited public awareness. This review critically examines the influence of drug marketing strategies on pharmacovigilance awareness and ADR reporting in tropical regions. It explores marketing techniques employed, their impact on healthcare professionals and patients, and the systemic barriers that hinder effective pharmacovigilance practices. Additionally, it highlights the need for ethical marketing, regulatory strengthening, and capacity building to enhance drug safety monitoring. The article aims to provide a structured understanding of how marketing practices shape pharmacovigilance outcomes and suggests strategies to bridge gaps in awareness and reporting systems in tropical healthcare settings.

Keywords: Drug marketing, tropical regions, pharmacovigilance, adverse drug reactions, ADR reporting, pharmaceutical promotion, healthcare systems, drug safety, public health, regulatory affairs

INTRODUCTION

Overview of Drug Marketing and Pharmacovigilance

Drug marketing is an essential component of the pharmaceutical industry, encompassing strategies used to promote medications to healthcare professionals and consumers. These strategies include detailing, direct-to-consumer advertising, sponsorships, incentives, and digital promotion. While marketing plays a legitimate role in disseminating drug information, it can also lead to irrational drug use when not adequately regulated.

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Received Date: May 04, 2026
Accepted Date: May 07, 2026
Published Date: May 20, 2026

Citation: Suraj Sen, Anit Jha, Rajeev Ratan, Aman, Ashish Pal. Drug Marketing in Tropical Regions and Its Effect on Pharmacovigilance Awareness and Reporting. International Journal of Tropical Medicines. 2026; 3(2): 1–17p.

Pharmacovigilance, on the other hand, serves as a safeguard against drug-related risks. It ensures that adverse drug reactions (ADRs) are identified, reported, and analyzed to improve patient safety. Effective pharmacovigilance systems rely heavily on the active participation of healthcare professionals, patients, and regulatory authorities [1].

Conceptual Relationship Between Drug Marketing and Pharmacovigilance

Drug marketing and pharmacovigilance are intrinsically linked. Marketing influences drug

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utilization patterns, which in turn affects the occurrence and reporting of ADRs. In settings where marketing dominates clinical decision-making, pharmacovigilance may be undermined due to:

- Underreporting of ADRs.
- Bias in drug perception.
- Lack of critical evaluation of drug safety.

This relationship becomes more pronounced in tropical regions where healthcare systems may lack robust regulatory frameworks [2].

Characteristics of Tropical Regions Affecting Drug Use

Tropical regions, including parts of Asia, Africa, and Latin America, share several common features that influence drug marketing and pharmacovigilance.

Problem Statement

Despite global efforts to strengthen pharmacovigilance systems, tropical regions continue to face significant challenges in ADR reporting and drug safety monitoring. One of the underexplored contributors to this issue is the nature of drug marketing practices in these regions.

Unethical or aggressive marketing may:

- Promote irrational prescribing.
- Suppress negative drug information.
- Discourage ADR reporting.
- Influence healthcare professionals' objectivity.

Understanding this dynamic is essential for developing targeted interventions to improve pharmacovigilance outcomes [3].

Scope and Objectives of the Review

This review aims to:

- Analyze drug marketing strategies prevalent in tropical regions.
- Examine their influence on healthcare professionals and patients.
- Evaluate the current state of pharmacovigilance awareness and reporting.
- Identify gaps and challenges in existing systems.
- Propose strategies to enhance ADR reporting and drug safety.

Structure of the Article

This article is organized into multiple sections, including:

- Background and Literature Review.
- Drug Marketing Strategies in Tropical Regions.
- Pharmacovigilance Systems and Challenges.
- Impact Analysis.
- Regulatory Perspectives.
- Recommendations and Future Directions.

Each section builds upon the previous to provide a comprehensive understanding of the topic [4].

Global Perspective on Pharmacovigilance Systems

Pharmacovigilance has evolved significantly over the past few decades, especially following major drug-related disasters such as the Thalidomide tragedy, which highlighted the critical need for systematic drug safety monitoring. Today, international organizations such as the World Health Organization (WHO) and the Uppsala Monitoring Centre (UMC) coordinate global pharmacovigilance activities.

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The WHO Programme for International Drug Monitoring (PIDM) supports member countries in establishing national pharmacovigilance centers and encourages spontaneous ADR reporting systems. Despite these global frameworks, implementation varies widely across regions, particularly in tropical countries [5].

Pharmacovigilance in Tropical Regions: Current Scenario

In tropical regions, pharmacovigilance systems are often in early developmental stages or face operational inefficiencies. Countries such as India, Nigeria, and Brazil have established national pharmacovigilance programs, but challenges persist in terms of:

- Underreporting of ADRs.
- Limited trained personnel.
- Poor integration with healthcare systems.
- Lack of digital reporting infrastructure.

For instance, the Pharmacovigilance Programme of India (PvPI) has made significant progress, yet ADR reporting rates remain lower than global expectations [6].

Role of Healthcare Professionals in ADR Reporting

Healthcare professionals (HCPs), including physicians, pharmacists, and nurses, play a central role in pharmacovigilance. Their responsibilities include:

- Identifying suspected ADRs.
- Documenting clinical observations.
- Reporting to national or regional centers.
- Educating patients on drug safety.

However, in tropical regions, several barriers affect HCP participation.

BACKGROUND AND LITERATURE REVIEW

Evolution of Drug Marketing Practices

Drug marketing has transformed from simple informational dissemination to highly strategic and data-driven promotional activities. Pharmaceutical companies now employ:

- Medical representatives (MRs).
- Sponsored conferences and CME programs.
- Digital marketing and social media campaigns.
- Free samples and promotional gifts.

While these strategies are designed to increase drug adoption, they may also lead to irrational prescribing, especially in regions with weak regulatory oversight [7].

Types of Drug Marketing Strategies

Drug marketing strategies can be broadly classified as follows:

In tropical regions, direct-to-physician (DTP) marketing is particularly dominant due to limited patient awareness and regulatory constraints on DTC advertising.

Ethical Concerns in Pharmaceutical Marketing

Unethical marketing practices have been widely reported in low- and middle-income countries. These include:

- Offering financial incentives or gifts to prescribers.
- Misleading claims about drug efficacy and safety.
- Suppression of negative clinical data.
- Promotion of off-label drug use.

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Such practices can distort clinical judgment and reduce the likelihood of ADR reporting, as healthcare professionals may be reluctant to report adverse effects associated with promoted drugs [8].

Impact of Marketing on Prescribing Behavior

Several studies have demonstrated that pharmaceutical marketing significantly influences prescribing patterns. Physicians exposed to frequent promotional activities are more likely to:

- Prescribe newer, expensive drugs.
- Prefer branded over generic medications.
- Overlook potential adverse effects.

This behavior is particularly concerning in tropical regions, where patients often bear out-of-pocket healthcare expenses.

Literature Evidence on Pharmacovigilance Awareness

Research indicates that pharmacovigilance awareness among healthcare professionals in tropical regions is suboptimal. For example:

- Studies in India show that less than 50% of physicians actively report ADRs.
- In African countries, ADR reporting rates are significantly lower than global averages.
- Lack of structured training programs contributes to poor awareness.

The World Health Organization has repeatedly emphasized the need for capacity building and education to strengthen pharmacovigilance systems in these regions [9].

Gap Analysis

Despite growing awareness, several gaps remain.

Need for Integrated Approach

There is a pressing need to integrate drug marketing regulation with pharmacovigilance systems. This includes:

- Monitoring promotional practices.
- Encouraging transparent communication of drug risks.
- Strengthening regulatory frameworks.
- Promoting ethical marketing standards.

Such integration can help ensure that drug promotion does not compromise patient safety.

DRUG MARKETING STRATEGIES IN TROPICAL REGIONS (DETAILED ANALYSIS)

Overview of Marketing Dynamics in Tropical Settings

Drug marketing in tropical regions differs significantly from that in developed countries due to variations in healthcare infrastructure, regulatory enforcement, socioeconomic conditions, and disease epidemiology. Pharmaceutical companies often adapt their promotional strategies to suit these environments, focusing on high-demand therapeutic areas such as infectious diseases, antimalarials, antibiotics, and vaccines.

In many tropical countries, the private healthcare sector dominates drug distribution, creating an environment where marketing efforts directly influence prescribing practices. The lack of stringent regulatory oversight further amplifies the impact of these strategies [10].

Role of Medical Representatives (MRs)

Medical representatives (MRs) serve as the primary interface between pharmaceutical companies and healthcare professionals in tropical regions. Their responsibilities include:

- Promoting specific drug brands.

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- Providing product information and clinical data.
- Distributing free samples.
- Building relationships with prescribers.

However, in many cases, medical representatives (MRs) may emphasize positive aspects of drugs while downplaying potential adverse effects. This selective information dissemination can negatively impact pharmacovigilance by:

- Reducing awareness of ADRs.
- Creating bias in drug perception.
- Discouraging critical evaluation of drug safety.

Promotional Incentives and Their Influence

Pharmaceutical companies often use incentives to influence prescribing behavior. These may include:

- Gifts (e.g., medical equipment, travel sponsorships).
- Financial incentives or honoraria.
- Sponsored conferences and workshops.
- Continuing Medical Education (CME) programs.

While some incentives are legitimate educational tools, others may cross ethical boundaries. Regulatory bodies such as the Medical Council of India (now NMC) have issued guidelines to restrict such practices, but enforcement remains inconsistent.

Direct-to-Consumer (DTC) Marketing in Tropical Regions

Unlike developed countries where direct-to-consumer (DTC) advertising is regulated, tropical regions often experience loosely controlled consumer-targeted promotions, especially for:

- Over-the-counter (OTC) drugs.
- Herbal and traditional medicines.
- Nutraceuticals and supplements.

These advertisements may:

- Exaggerate benefits.
- Omit safety warnings.
- Encourage self-medication.

This leads to an increased risk of adverse drug reactions, many of which go unreported due to a lack of awareness [11].

Marketing of Generic vs. Branded Drugs

In tropical regions, both generic and branded drugs coexist, often with significant price differences. Marketing strategies vary accordingly:

Branded drugs are aggressively marketed, which may overshadow their safety profiles. In contrast, generics receive less promotional attention, potentially affecting awareness about their ADRs as well.

Influence of Informal Healthcare Sector

A significant portion of healthcare in tropical regions is delivered by informal or unqualified practitioners. These providers often:

- Lack formal medical training.
- Rely heavily on pharmaceutical marketing for drug knowledge.
- Prescribe drugs irrationally.

Pharmaceutical companies may target this sector due to its wide reach, further complicating pharmacovigilance efforts. ADRs occurring in such settings are rarely documented or reported.

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Digital Transformation in Drug Marketing

With increasing internet penetration, digital marketing has emerged as a powerful tool even in tropical regions. Strategies include:

- Mobile health (mHealth) applications.
- Social media campaigns.
- Online medical education platforms.
- Email marketing to healthcare professionals.

While digital platforms can enhance information dissemination, they also pose risks of misinformation if not properly regulated [12].

Regulatory Frameworks Governing Drug Marketing

Regulatory oversight varies across tropical countries. In India, bodies such as the:

- Central Drugs Standard Control Organization (CDSCO).
- and the Department of Pharmaceuticals are responsible for monitoring drug approval and marketing practices.

However, challenges include:

- limited enforcement capacity.
- Lack of transparency.
- Inadequate penalties for violations.

This regulatory gap allows unethical marketing practices to persist, indirectly affecting pharmacovigilance systems (Table 1).

Table 1. Marketing impact on pharmacovigilance.

Marketing factor	Effect on pharmacovigilance
Aggressive promotion	Increased drug use, higher ADR risk.
Selective information	Reduced ADR awareness.
Incentives to prescribers	Bias in reporting.
Informal sector targeting	Poor ADR documentation.
Weak regulation	unethical practices.

Summary of Marketing Impact on Pharmacovigilance

Key Observations

- Drug marketing in tropical regions is highly influential and often underregulated.
- Healthcare professionals are primary targets of promotional strategies.
- Informal healthcare systems amplify the impact of marketing.
- Pharmacovigilance awareness is compromised due to biased information flow.

PHARMACOVIGILANCE SYSTEMS, MECHANISMS, AND REPORTING PROCESSES

Concept and Scope of Pharmacovigilance

Pharmacovigilance is a critical component of drug safety surveillance, encompassing the detection, assessment, understanding, and prevention of adverse effects or any other drug-related problems. According to the World Health Organization, pharmacovigilance ensures that the benefits of medicines outweigh their risks throughout their lifecycle.

Its scope extends beyond conventional drugs to include:

- Vaccines.
- Herbal medicines.
- Biologicals and biosimilars.
- Medical devices.
- Nutraceuticals.

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In tropical regions, where polypharmacy and self-medication are common, pharmacovigilance becomes even more essential.

Structure of Pharmacovigilance Systems

A typical pharmacovigilance system operates at multiple levels:

- ***Local Level (Healthcare Facilities)***
  - Detection and initial reporting of ADRs.
  - Documentation by healthcare professionals.
- ***Regional/National Level***
  - Collection and analysis of ADR reports.
  - Signal detection and risk assessment.
- ***International Level***
  - Data sharing through global databases such as VigiBase (managed by Uppsala Monitoring Centre).
  - Identification of global safety signals.

Types of Adverse Drug Reactions (ADRs)

ADRs are broadly classified based on their nature and mechanism. (Table 2)

Table 2. Types of drug reaction.

Type	Description	Example
Type A (Augmented)	Dose-dependent and predictable	Hypoglycemia from insulin.
Type B (Bizarre)	Idiosyncratic, unpredictable	Anaphylaxis from penicillin.
Type C (Chronic)	Long-term effects	Adrenal suppression from steroids.
Type D (Delayed)	Appears after time	Carcinogenesis.
Type E (End of use)	Withdrawal effects	Opioid withdrawal.
Type F (Failure)	Therapeutic failure	Antibiotic resistance.

Understanding ADR classification is essential for accurate reporting and causality assessment.

ADR Reporting Mechanisms

ADR reporting can be conducted through multiple channels:

- ***Spontaneous Reporting System (SRS)***
  - Voluntary reporting by healthcare professionals and patients.
  - Most widely used method.
  - *Example:* Yellow Card Scheme.
- ***Cohort Event Monitoring (CEM)***
  - Active surveillance of specific patient groups.
  - Useful for new drugs.
- ***Electronic Reporting Systems***
  - Online portals and mobile applications.
  - Increasing adoption in countries like India via PvPI.
- ***Hospital-Based Monitoring***
  - ADR monitoring centers within hospitals.
  - Structured data collection.

Pharmacovigilance Programme of India (PvPI)

The Pharmacovigilance Programme of India (PvPI) is a flagship initiative aimed at improving drug safety monitoring in India [13].

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Key Features

- National Coordinating Centre at the Indian Pharmacopoeia Commission.
- Network of ADR Monitoring Centres (AMCs).
- Online reporting via VigiFlow system.
- Public awareness campaigns.

Despite these advancements, underreporting remains a major challenge, especially in rural and tropical areas.

Causality Assessment and Signal Detection

After ADRs are reported, they undergo systematic evaluation:

Causality Assessment Methods

- WHO-UMC scale.
- Naranjo algorithm.

Signal Detection

A signal refers to information that suggests a new potential causal association between a drug and an adverse event.

Steps include:

- Data aggregation.
- Statistical analysis.
- Clinical validation.
- Regulatory action.

Barriers to Effective Pharmacovigilance in Tropical Regions

Several systemic and socio-economic barriers hinder effective pharmacovigilance. (Table 3)

Table 3. Barriers hindering effective pharmacovigilance.

Barrier category	Specific issues
Educational	Lack of training in ADR reporting.
Institutional	Absence of dedicated pharmacovigilance units.
Technological	Limited access to digital tools.
Cultural	Fear of blame or legal consequences.
Economic	Lack of incentives for reporting.
Regulatory	Weak enforcement of reporting mandates.

Role of Patients in Pharmacovigilance

Patient involvement is increasingly recognized as a valuable component of pharmacovigilance. Patients can:

- Report ADRs directly.
- Provide real-world drug safety data.
- Improve signal detection.

However, in tropical regions, patient participation is limited due to:

- Low health literacy.
- Lack of awareness of reporting systems.
- Cultural barriers

Integration of Pharmacovigilance with Public Health Programs

In tropical regions, pharmacovigilance is often integrated with national disease control programs, such as:

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- Malaria control programs.
- Tuberculosis treatment initiatives.
- HIV/AIDS management programs.

This integration helps in monitoring drug safety in large populations but requires strong coordination and data management systems [14].

Summary of Key Mechanisms

Key Observations

- Pharmacovigilance systems exist but are underutilized in tropical regions.
- Spontaneous reporting remains the backbone but suffers from underreporting.
- Digital tools offer promise but require infrastructure support.
- Integration with public health programs can enhance coverage (Table 4).

Table 4. Components and their functions.

Component	Function
ADR Detection	Identification of adverse events.
Reporting	Documentation and submission.
Analysis	Causality and signal detection.
Regulation	Safety alerts and policy changes.
Communication	Dissemination of safety information.

IMPACT OF DRUG MARKETING ON PHARMACOVIGILANCE AWARENESS AND REPORTING (CORE ANALYSIS)

Overview of Interaction Between Marketing and Pharmacovigilance

Drug marketing and pharmacovigilance operate within the same pharmaceutical ecosystem but often with conflicting priorities. While marketing aims to maximize drug adoption and sales, pharmacovigilance focuses on ensuring safety and minimizing risks. In tropical regions, this imbalance is more pronounced due to weaker regulatory oversight and limited healthcare resources.

Marketing practices can directly and indirectly influence:

- Awareness of adverse drug reactions (ADRs).
- Attitudes of healthcare professionals toward reporting.
- Patient perception of drug safety.
- Transparency of drug-related information.

Conceptual Model of Influence

The interaction can be conceptualized as a cycle:

- Drug Promotion.
- Increased Prescription and Usage.
- Occurrence of ADRs.
- Reporting (or underreporting).
- Safety signal detection (or failure).

When marketing suppresses or biases information, the cycle is disrupted at the reporting stage.

Influence on Healthcare Professionals' Awareness

Drug marketing significantly shapes the knowledge base of healthcare professionals (HCPs), especially in tropical regions where independent drug information sources may be limited.

Positive Contributions

- Dissemination of new drug information.
- Updates on therapeutic advancements.

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- Access to clinical trial data.

Negative Impacts

- Selective presentation of benefits over risks.
- Underemphasis on ADRs.
- Creation of brand loyalty that overrides critical judgment.

Impact on ADR Reporting Behavior

Marketing practices can significantly influence whether ADRs are reported:

Mechanisms of Influence

- *Psychological Bias*
  - Physicians may hesitate to report ADRs associated with drugs they frequently prescribe or are incentivized to promote.
- *Perceived Drug Safety*
  - Aggressive marketing creates a perception of safety, reducing vigilance.
- *Fear of Professional Consequences*
  - Reporting ADRs may be seen as admitting prescribing errors.
- *Lack of Emphasis on Safety in Promotion*
  - Marketing materials rarely highlight pharmacovigilance responsibilities.

Impact on Patient Awareness and Behavior

Patients in tropical regions are highly susceptible to marketing influences due to:

- Low health literacy.
- Limited access to professional healthcare.
- Cultural reliance on advertisements.

Consequences

- Increased self-medication.
- Misinterpretation of drug safety.
- Failure to recognize ADRs.
- Low reporting rates.

Patients rarely associate adverse effects with medications promoted as “safe” or “effective.”

Case Examples from Tropical Regions

India

- High exposure to pharmaceutical marketing.
- Moderate pharmacovigilance infrastructure via Pharmacovigilance Programme of India.
- Persistent underreporting due to marketing bias.

Nigeria

- Strong presence of informal healthcare providers.
- Heavy reliance on pharmaceutical promotion.
- Minimal ADR reporting systems.

Brazil

- More structured regulatory system.
- Better pharmacovigilance integration.
- Still influenced by marketing in the private sector.

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Influence of Marketing on Drug Safety Perception

Marketing often shapes the risk-benefit perception of drugs. (Table 5)

Table 5. Effect of marketing on pharmacovigilance.

Factor	Marketing effect	Pharmacovigilance outcome
Drug efficacy claims	Overemphasized	Increased usage.
Safety profile	Underreported	Reduced ADR awareness.
Brand image	Strengthened	Reporting bias.
Patient testimonials	Emotional influence	Self-medication.

Ethical vs. Unethical Marketing: Impact Comparison

Ethical marketing supports pharmacovigilance by promoting transparency, while unethical practices undermine drug safety systems. (Table 6)

Table 6. Aspects of ethical vs. unethical marketing.

Aspect	Ethical marketing	Unethical marketing
Information accuracy	Balanced	Misleading.
ADR communication	Transparent	Suppressed.
HCP influence	Educational	Manipulative.
Pharmacovigilance impact	Positive	Negative.

Systemic Consequences

The cumulative effect of marketing on pharmacovigilance in tropical regions includes:

- Chronic underreporting of ADRs.
- Delayed detection of safety signals.
- Increased incidence of preventable drug-related harm.
- Weak regulatory response.

Key Observations

- Drug marketing significantly influences both awareness and reporting of ADRs.
- Healthcare professionals are primary targets, leading to biased reporting behavior.
- Patients are indirectly affected through misleading promotions.
- The impact is amplified in tropical regions due to systemic vulnerabilities.

REGULATORY PERSPECTIVES, ETHICAL FRAMEWORKS, AND CONTROL STRATEGIES

Importance of Regulatory Oversight in Drug Marketing

Effective regulation is essential to balance pharmaceutical promotion with patient safety. In tropical regions, regulatory systems often face challenges such as limited resources, fragmented enforcement, and a lack of transparency. This creates an environment where aggressive or unethical marketing can flourish, thereby negatively impacting pharmacovigilance [15].

Regulatory oversight aims to:

- Ensure accuracy of drug information;
- Prevent misleading advertisements;
- Promote ethical interactions with healthcare professionals;
- Safeguard public health.

Global Regulatory Frameworks

International organizations play a crucial role in setting standards for drug marketing and pharmacovigilance.

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Key Global Bodies

- World Health Organization.
- International Council for Harmonisation.
- Uppsala Monitoring Centre.

These organizations provide:

- Guidelines on pharmacovigilance practices.
- Ethical standards for drug promotion.
- Frameworks for international data sharing.

For example, WHO's "Ethical Criteria for Medicinal Drug Promotion" emphasizes that all promotional material must be accurate, balanced, and not misleading [16].

National Regulatory Systems in Tropical Regions

Different tropical countries have established regulatory authorities, though their effectiveness varies. (Table 7)

Table 7. Regulatory authority and its functions.

Country	Regulatory authority	Key functions
India	Central Drugs Standard Control Organization	Drug approval, monitoring, enforcement.
Brazil	ANVISA	Regulation of drugs and marketing.
Nigeria	NAFDAC	Drug control and safety monitoring.

Despite these frameworks, enforcement gaps remain a major concern.

Ethical Guidelines for Pharmaceutical Marketing

Ethical marketing is guided by both international and national codes. These include:

WHO Ethical Criteria

- Promotion must be truthful and not misleading.
- Safety information must be clearly communicated.
- Claims must be supported by scientific evidence.

Industry Codes

- International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) Code.
- National guidelines (e.g., Uniform Code of Pharmaceutical Marketing Practices in India).

Challenges in Regulatory Enforcement

Key challenges include the following: (Table 8)

Table 8. Challenges and their impact.

Challenge	Impact
Limited manpower	Inadequate monitoring of marketing practices.
Corruption and conflicts of interest	Weak enforcement.
Lack of transparency	Reduced accountability.
Inconsistent policies	Regulatory loopholes.
Rural healthcare gaps	Unregulated drug promotion.

These issues allow unethical marketing practices to persist, undermining pharmacovigilance systems.

Strategies to Improve Regulatory Control

To strengthen the link between drug marketing and pharmacovigilance, several strategies can be implemented:

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- ***Strengthening Legal Frameworks***
  - Enforce strict penalties for unethical marketing.
  - Mandate disclosure of promotional activities.
- ***Enhancing Monitoring Systems***
  - Regular audits of pharmaceutical companies.
  - Surveillance of promotional materials.
- ***Integration with Pharmacovigilance***
  - Link marketing approval with safety reporting obligations.
  - Require post-marketing surveillance data.
- ***Capacity Building***
  - Training regulators and inspectors.
  - Improving infrastructure and digital tools.

Role of Academic and Healthcare Institutions

Educational institutions and hospitals play a critical role in promoting ethical practices:

- Incorporating pharmacovigilance in curricula.
- Conducting training workshops.
- Encouraging ADR reporting culture.
- Reducing dependence on promotional information.

Public Awareness and Community Engagement

Improving public awareness is essential to counteract misleading marketing:

- Health education campaigns.
- Community outreach programs.
- Use of mass media and digital platforms.
- Patient empowerment initiatives.

Increased awareness can lead to:

- Better recognition of ADRs.
- Increased reporting rates.
- Safer drug use practices.

Digital Regulatory Innovations

Emerging technologies can enhance regulatory effectiveness:

- E-pharmacovigilance platforms.
- AI-based signal detection.
- Mobile ADR reporting applications.
- Real-time monitoring of drug promotion.

These innovations can bridge gaps in tropical regions with limited infrastructure. (Table 9)

Table 9. Policy areas and their recommendations.

Area	Recommendation
Regulation	Strengthen enforcement mechanisms.
Education	Integrate pharmacovigilance training.
Technology	Promote digital reporting systems.
Marketing	Enforce ethical promotion standards.
Public Health	Increase awareness campaigns.

Policy Recommendations

Key Observations

- Regulatory frameworks exist but are inconsistently enforced in tropical regions.

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- Ethical marketing is critical for improving pharmacovigilance outcomes.
- Integration of regulation, education, and technology is essential.
- Public awareness can act as a counterbalance to misleading promotion.

APPLICATIONS, ADVANTAGES, LIMITATIONS, AND FUTURE PERSPECTIVES

Applications of Integrated Drug Marketing and Pharmacovigilance Systems

The integration of ethical drug marketing practices with robust pharmacovigilance systems has several important applications, particularly in tropical regions where healthcare challenges are multifactorial [17].

Key Application Areas

- *Improved Drug Safety Monitoring*
  - Enhanced ADR detection and reporting.
  - Early identification of safety signals.
- *Rational Drug Use Promotion*
  - Evidence-based prescribing practices.
  - Reduction in polypharmacy and irrational drug combinations.
- *Public Health Surveillance*
  - Monitoring drug safety in mass treatment programs (e.g., malaria, tuberculosis).
  - Supporting national health initiatives.
- *Regulatory Decision-Making*
  - Data-driven policy formulation.
  - Drug recalls and safety alerts.
- *Pharmaceutical Industry Accountability*
  - Transparent reporting of post-marketing data.
  - Ethical promotion aligned with safety profiles [18].

Advantages of Strengthened Pharmacovigilance in Marketing Context

A well-integrated system offers numerous advantages (Table 10).

Table 10. Advantages of strengthened pharmacovigilance.

Advantage	Description
Enhanced patient safety	Reduction in preventable ADRs.
Increased trust in healthcare	Transparency improves confidence.
Better clinical decision-making	Access to real-world safety data.
Regulatory efficiency	Faster response to safety concerns
Cost reduction	Prevention of drug-related complications

Limitations and Challenges

Despite its potential, several limitations hinder effective integration:

- ***Structural Limitations***
  - Inadequate healthcare infrastructure.
  - Lack of trained pharmacovigilance personnel.
- ***Behavioral Barriers***
  - Resistance from healthcare professionals.
  - Dependence on pharmaceutical marketing.
- ***Economic Constraints***
  - Limited funding for pharmacovigilance programs.
  - High cost of implementing digital systems.
- ***Regulatory Weaknesses***
  - Inconsistent enforcement of guidelines.
  - Lack of coordination between agencies.

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- ***Data-Related Issues***
  - Underreporting of ADRs.
  - Poor data quality and analysis.

Comparative Analysis: Developed vs. Tropical Regions

This comparison highlights the urgent need for targeted interventions in tropical regions. (Table 11)

Table 11. Developed vs. tropical regions.

Parameter	Developed regions	Tropical regions
Regulatory strength	Strong	Moderate to weak.
ADR reporting rate	High	Low.
Digital infrastructure	Advanced	Limited.
Marketing control	Strict	Variable.
Public awareness	High	Low.

Emerging Trends in Pharmacovigilance

Modern pharmacovigilance is evolving with technological advancements:

- ***Artificial Intelligence (AI) and Machine Learning***
  - Automated signal detection.
  - Predictive analysis of ADRs.
- ***Big Data Analytics***
  - Integration of real-world data.
  - Enhanced risk assessment.
- ***Mobile Health (mHealth)***
  - Patient-centric ADR reporting apps.
  - Increased accessibility in rural areas.
- ***Blockchain Technology***
  - Secure and transparent data sharing.
  - Prevention of data manipulation.

Future Perspectives

To improve pharmacovigilance awareness and reporting in tropical regions, future efforts should focus on:

- ***Strengthening Education and Training***
  - Incorporating pharmacovigilance into medical and pharmacy curricula.
  - Continuous professional development programs.
- ***Promoting Ethical Marketing***
  - Enforcing strict guidelines.
  - Encouraging transparency in drug promotion.
- ***Enhancing Digital Infrastructure***
  - Expanding access to online reporting systems.
  - Utilizing mobile technology for rural outreach.
- ***Community Engagement***
  - Empowering patients to report ADRs.
  - Conducting awareness campaigns.
- ***International Collaboration***
  - Sharing data and best practices.
  - Strengthening global pharmacovigilance networks led by the World Health Organization [19].

Strategic Framework for Improvement

Key Observations

- Integration of marketing and pharmacovigilance improves healthcare outcomes.

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- Technological innovations offer significant opportunities.
- Structural and behavioral barriers must be addressed.
- Multi-stakeholder collaboration is essential. (Table 12).

Table 12. Major domains and their strategic actions.

Domain	Strategic action
Education	Training programs for HCPs.
Regulation	Strong enforcement policies.
Technology	Digital ADR reporting tools.
Industry	Ethical marketing compliance.
Community	Public awareness initiatives.

CONCLUSION

Drug marketing in tropical regions plays a pivotal role in shaping healthcare practices, influencing prescribing behaviors, and determining patient perceptions of drug safety. While marketing is essential for disseminating therapeutic advancements, its unchecked or unethical execution can significantly undermine pharmacovigilance systems.

This review has demonstrated that in tropical regions – characterized by high disease burden, limited healthcare infrastructure, and variable regulatory enforcement – drug marketing often exerts a disproportionate influence on both healthcare professionals and patients. Aggressive promotional strategies, combined with insufficient emphasis on drug safety, contribute to a culture of underreporting of adverse drug reactions (ADRs).

Pharmacovigilance systems, although established in many tropical countries through initiatives such as the Pharmacovigilance Programme of India, continue to face challenges, including low awareness, inadequate training, infrastructural limitations, and sociocultural barriers. The interplay between marketing practices and pharmacovigilance awareness reveals a critical gap: while drug utilization is actively promoted, drug safety monitoring is often neglected.

The analysis further highlights that healthcare professionals, being primary targets of pharmaceutical marketing, may develop biases that affect ADR reporting behavior. Similarly, patients exposed to misleading or incomplete drug information are less likely to recognize or report adverse effects. These issues are compounded in rural and informal healthcare settings, where pharmacovigilance mechanisms are weakest.

To address these challenges, a multifaceted approach is required:

- Strengthening regulatory frameworks and ensuring strict enforcement of ethical marketing practices.
- Enhancing pharmacovigilance education and training among healthcare professionals.
- Promoting public awareness and patient participation in ADR reporting.
- Leveraging digital technologies to improve reporting systems and data analysis.
- Encouraging transparency and accountability within the pharmaceutical industry.

Global collaboration, particularly through organizations such as the World Health Organization and the Uppsala Monitoring Centre, is essential to harmonize pharmacovigilance efforts and support capacity building in tropical regions.

In conclusion, aligning drug marketing practices with pharmacovigilance objectives is crucial for ensuring patient safety and improving healthcare outcomes. Ethical promotion, combined with robust safety monitoring, can create a balanced pharmaceutical ecosystem where therapeutic benefits are maximized without compromising public health.

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REFERENCES

1. Kongkaew C, Phan DT, Janusorn P, Mongkhon P. Estimating adverse events associated with herbal medicines using pharmacovigilance databases: Systematic review and meta-analysis. JMIR Public Health Surveill. 2024;10(1):e63808.
2. Kumar A. Pharmacovigilance: Importance, concepts, and processes. Am J Health Syst Pharm. 2012;74(8):606–12.
3. Mugada V, Suryadevara V, Cheekurumilli M, Yarguntla SR. Signal detection in pharmacovigilance: Methods, tools, and workflows from case identification to adverse drug reaction database entry. Przegl Epidemiol. 2025;79(3):404–14.
4. Hartford CG, Petchel KS, Mickail H, Perez-Gutthann S, McHale M, Grana JM, Marquez P. Pharmacovigilance during the pre-approval phases: An evolving pharmaceutical industry model in response to ICH E2E, CIOMS VI, FDA and EMEA/CHMP risk-management guidelines. Drug Saf. 2006;29(8):657–73.
5. Jahncke E, Lim MK, Seow A, Chia KS, Wilder-Smith A. Global health: challenges and opportunities for Singapore. Singapore Med J. 2010;51(7):536–41.
6. Yadav P, Bahmani K, Pawar N, Sharma AA. Review on: Indian Pharma Regulatory System and List of New Drugs Approved by Central Drugs Standard Control Organization in the Year 2021 Till Date. Int J Pharm Sci Res. 2021;12:5642–51.
7. Munshi RH, Singh KR, Thakkar AD. Understanding the degree of awareness among medical professionals regarding the ethics of pharmaceutical marketing activities in context of revised medical council of India code of ethics. Int J Basic Clin Pharmacol. 2016;5(2):263.
8. Vogler M, Ricci Conesa H, de Araújo Ferreira K, Moreira Cruz F, Simioni Gasparotto F, Fleck K, et al. Electronic reporting systems in pharmacovigilance: The implementation of VigiFlow in Brazil. Pharm Med. 2020;34(5):327–34.
9. Dan-Nwafor C, Ochu CL, Elimian K, Oladejo J, Ilori E, Umeokonkwo C, et al. Nigeria's public health response to the COVID-19 pandemic: January to May 2020. J Glob Health. 2020;10(2):020399.
10. Ho CM. A dangerous concoction: Pharmaceutical marketing, cognitive biases, and first amendment overprotection. Ind Law J. 2019;94:773.
11. Spurling GK, Mansfield PR, Montgomery BD, Lexchin J, Doust J, Othman N, et al. Information from pharmaceutical companies and the quality, quantity, and cost of physicians' prescribing: A systematic review. PLoS Med. 2010;7(10):e1000352.
12. Oshikoya KA, Awobusuyi JO. Perceptions of doctors to adverse drug reaction reporting in a teaching hospital in Lagos, Nigeria. BMC Clin Pharmacol. 2009;9(1):14.
13. Gupta P, Udupa A. Adverse drug reaction reporting and pharmacovigilance: Knowledge, attitudes and perceptions amongst resident doctors. J Pharm Sci Res. 2011;3(2):1064.
14. Adegbuyi TA, Fadare JO, Araromi EJ, Sijuade AO, Bankole I, Fasuba IK, Alabi RA. Assessment of knowledge, attitude and practice of adverse drug reaction reporting among healthcare professionals working in primary, secondary and tertiary healthcare facilities in Ekiti State, South-West Nigeria. Hosp Pharm. 2021;56(6):751–9.
15. Bhagavathula AS, Elnour AA, Jamshed SQ, Shehab A. Health professionals' knowledge, attitudes and practices about pharmacovigilance in India: A systematic review and meta-analysis. PLoS One. 2016;11(3):e0152221.
16. Ofori-Asenso R, Agyeman AA. Irrational use of medicines—A summary of key concepts. Pharmacy (Basel). 2016;4(4):35.
17. Mangla N, Gupta M. Evaluation of rationality of drug promotional literature using WHO ethical criteria for medicinal drug promotion. Int J Health Sci Res. 2018;8(4):55–62.
18. Gagnon MA, Lexchin J. The cost of pushing pills: A new estimate of pharmaceutical promotion expenditures in the United States. PLoS Med. 2008;5(1):e1.
19. Hazell L, Shakir SA. Under-reporting of adverse drug reactions. Drug Saf. 2006;29(5):385–96.

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