ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Toward a Regulated Future: Assessing Management of Zimbabwe's Informal Pharmaceutical Market

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DOI: https://doi.org/10.51583/IJLTEMAS.2026.150600291

Received: 13 July 2026; Accepted: 18 July 2026; Published: 04 August 2026

ABSTRACT

The study investigated the drivers of Zimbabwe's informal pharmaceutical market, focusing on its sources, distribution, and public health impact in Harare's Central Business District. This market raises significant concerns about the quality and safety of medicinal drugs, contributing to antimicrobial resistance and undermining legitimate pharmaceutical businesses. The study employed a sequential explanatory mixed-methods design, collecting data from 51 participants, including consumers, vendors, regulators, and distributors, through questionnaires. The findings indicate that unregistered vendors source medicinal drugs primarily from locals and international suppliers. The distribution occurs directly to consumers through sachets at transport hubs, from car boots and street corners. Despite the perception among sellers and customers that these medicinal drugs are benign unless abused, the study highlights an urgent need for intervention. The study recommended policy actions, including public awareness campaigns on the dangers of unregulated medicinal drugs, strengthening border screening, and implementing a national health insurance policy to improve health delivery and outcomes in Zimbabwe. The study suggested an Informal Pharmaceutical Market Elimination Framework to protect consumers from unregulated medicinal products and promote the formal pharmaceutical market. The framework is legitimacy-sensitive and synchronous digital hierarchy–driven, escalates punishment for corrupt actors, and targets all involved stakeholders.

Keywords: Informal Pharmaceutical Market, Unregulated Medicinal Drugs, Social Determinants of Health (SDOH), Social Network Analysis (SNA), Balloon-Squeeze Concept

JEL Classification: I18, O17, L51

INTRODUCTION

Globally, nearly two billion people lack access to essential medicines, which are critical to achieving the Sustainable Development Goals and Universal Health Coverage (WHO, 2021; 2019; 2017; UN, 2019). However, the rise of unregulated medicinal drugs and informal pharmaceutical markets, especially in low- and middle-income countries (LMICs), threatens the affordability and quality of these essential health services. Zimbabwe, like other African LMICs, faces significant challenges in healthcare delivery, with fragmented distribution systems and a proliferation of poor-quality medicines (Yadav, Stapleton, & Van Wassenhove, 2012). The informal pharmaceutical market has become particularly prominent in urban centres in Zimbabwe, operating outside regulatory frameworks. This market is fuelled by economic instability, limited access to formal healthcare, and the high prices of legitimate medicinal drugs, driving many to seek affordable, albeit potentially unsafe options from unregulated sources (Gaudiano, et al., 2007). This study investigated the sources, distribution, and public health impact of the informal pharmaceutical market to inform effective interventions.

The growth of the global medicine market, together with increased self-medication and the pharmaceuticalisation process, has led to greater circulation and autonomous use of medicines (Nichter, 2021; Ushie, Ugal, & Ingwu, 2016). In Sub-Saharan Africa, public health systems struggle with an inadequate supply of medicines, pushing consumers towards a diversified private sector that often includes unregulated providers (Wafula, Miriti, & Goodman, 2021; Smith, 2019). The World Health Organisation estimated that 10% of medicines in LMICs are

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substandard and falsified, a major health challenge that the World Health Assembly addressed with a resolution in 2012 (WHO, 2018; 2012). In Zimbabwe, the informal pharmaceutical market has become a significant part of the economy due to economic decline, business closures, high unemployment, and a dilapidated health system, making unregistered pharmaceutical vendors a primary source for medications for the majority of people who cannot afford formal healthcare or health insurance (Chimhete, 2024; Gonzalez, Chikanda, & Mavhunga, 2021; AHFOZ, 2021).

This influx of unregulated medicines, often prescription medicinal drugs, leads to a significant public health concern about antimicrobial resistance (Mok, Chikanda, & Mureverwi, 2020). The misuse of antibiotics bought informally, without proper medical consultation, contributes to bacteria evolving resistance, a crisis that causes over 5 million deaths annually and is projected to surpass cancer fatalities by 2050 (Salam, et al., 2023; Ghebreyesus, 2022). Children in Sub-Saharan Africa are particularly vulnerable, with high mortality rates from antibiotic resistance and a significant burden from diseases like tuberculosis (Joi, 2024). Furthermore, the Medicines Control Authority of Zimbabwe has found that many informally sold drugs lack active ingredients, causing harm or even death (Chimbwanda & Rukwata, 2026), similar to what was discussed in Hauk, Hagen, and Heide (2021). In Harare, unlicensed vendors strategically offer a wide range of products, including potent prescription medicinal drugs, compromising the integrity of the supply chain and highlighting the urgent need for effective public health strategies and regulatory frameworks to ensure safe and effective medications for all Zimbabweans (Masiyiwa, 2025; StaffReporter, 2025).

According to Levy and Sidel (2009), the pervasive, unregulated informal pharmaceutical market, largely fuelled by chronic funding shortages and economic instability, which rendered formal healthcare services and legitimate pharmacies inaccessible or unaffordable for most of the population, significantly undermined the Zimbabwean healthcare system. Zimbabwe produced only 30% of essential medicinal drugs, with 70% imported (StaffReporter2, 2025). The effect of the informal pharmaceutical market on the healthcare system in Zimbabwe caused an increase of 67% in total complaints from 2019 to 2020 (Maunga, 2021). The Medicines Control Authority of Zimbabwe has raised concerns about the lack of regulation in the pharmaceutical sector, citing a rise in advertisements for unregistered medicinal drugs on social media platforms (Tembo, 2023). The widespread availability and use of these substandard drugs contribute critically to public health crises, notably the rising antimicrobial resistance within the Zimbabwean population, which accounted for 3 900 attributable deaths and 15 800 associated deaths in 2019 (Ghebreyesus, 2022). This situation not only endangers individual health through unsafe medicinal drugs and improper guidance on use but also jeopardises broader public health initiatives and necessitates urgent research into effective management strategies and policy interventions to safeguard public health. The research objectives were to determine the sources of unregistered medicinal drugs, analyse the key channels through which they are distributed, and assess the impact of the informal pharmaceutical market on public health in Zimbabwe.

LITERATURE REVIEW

The study conducted a comprehensive review of the literature concerning the informal pharmaceutical market, focusing on theoretical frameworks and key factors. The study is anchored in a tripartite theoretical framework. At the macro level, Responsive Regulation theory (Ayres & Braithwaite, 1992) and Institutional theory (Müller, Drouin, & Sankaran, 2019) explain the emergence and persistence of informal sources of unregistered medicinal drugs amid regulatory gaps. At the meso level, Social Network Analysis (Moreno, 1934) maps the distribution pathways and actors sustaining the informal pharmaceutical market in Zimbabwe. At the micro level, the Social Determinants of Health (Dahlgren & Whitehead, 1991) framework assesses how these markets shape Zimbabwe's public health system.

The Responsive Regulation theory (Ayres & Braithwaite, 1992) proposes that pharmaceutical drug regulators should be responsive to the conduct and culture of players in the pharmaceutical market, whether in informal or formal markets, using a mix of persuasion and punishment. *Is the mix effective in controlling the informal pharmaceutical market in Zimbabwe*, where StaffReporter2 (2025) reported that the country meets 30% of the medicinal drug demand, with the remaining 70% being imported? There are insufficient resources to import medicinal drugs through the formal pharmaceutical supply chain, as reported by Chibamu (2021). The

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Responsive Regulation theory (Ayres & Braithwaite, 1992) implements the regulatory pyramid, soft words before hard words, and contextually responsive regulation instruments to persuade and punish informal pharmaceutical market players to comply with Zimbabwe's regulations. The Institutional theory (Müller, Drouin, & Sankaran, 2019) explains that pharmaceutical players adopt structures, policies and behaviours not for efficiency but for legitimacy and alignment with external expectations. Thus, Institutional theory (Müller, Drouin, & Sankaran, 2019) employs legitimacy seeking, isomorphism, and institutional environment instruments to control the operations of pharmaceutical actors. The Responsive Regulation (or smart regulation) theory (Ayres & Braithwaite, 1992) often incorporates Institutional theory (Müller, Drouin, & Sankaran, 2019) by recognising that regulators must understand the institutional pressures under which pharmaceutical players operate. The differences between the Responsive Regulation theory (Ayres & Braithwaite, 1992) and the Institutional theory (Müller, Drouin, & Sankaran, 2019) are presented in Table 1.

Table 1: Key Differences between Responsive Regulation and Institutional Theories

Feature	Responsive Regulation Theory	Institutional Theory
Primary Focus	Regulator behaviour (How to act)	Regulated entity behaviour (Why to obey)
Core Concept	Regulatory Pyramid (tit-for-tat)	Legitimacy, Norms, Isomorphism
Perspective	Pragmatic/Dynamic	Sociological/Structural
View of Firm	Rational calculator or cooperative partner	Entity seeking social approval

The Social Network Analysis (Moreno, 1934) was popularised by the useful works by Wasserman and Faust (1997) and Scott (2000). The Social Network Analysis (Moreno, 1934) is about mapping and leveraging the relationships between Zimbabwean people (consumers) and informal pharmaceutical drug suppliers to influence prescribing, adoption, access and commercial strategy. It uses graphs to identify key influencers, information bottlenecks, and diffusion pathways for new drugs, treatments, or medical practices in the Zimbabwean informal pharmaceutical market. The Social Network Analysis (Moreno, 1934) treats all Zimbabwean pharmaceutical actors (objects or nodes) as equal in the medicinal drug market. The Social Determinants of Health (Braveman, Egerter, & Williams, 2011) outlines non-medical conditions in people's living environments that significantly influence health outcomes, disparities and quality of life (WHO, 2025; HP2030, n.d.). These social determinants of health (CDC, 2024) are discussed in frameworks such as those developed by WHO (WHO, 2025) and Healthy People 2030 (HP2030, n.d.). According to Chabalenge, Sahota, Ermolina, and Tanna (2025), the only four countries in Africa that manufacture vaccines were Egypt, Senegal, South Africa and Tunisia. The only three manufacturers of active pharmaceutical ingredients in Africa were located in Ghana and South Africa (Conway, Holt, Sabow, & Sun, 2019). The social determinants of health (Dahlgren & Whitehead, 1991), such as inequality, weak healthcare systems, and poverty, create an environment conducive to the thriving informal pharmaceutical market in Zimbabwe.

RESEARCH METHODOLOGY

Research Methodology: This study employs a sequential explanatory mixed-methods design to investigate the informal pharmaceutical market in Harare's Central Business District in Zimbabwe, focusing on its sources, distribution, and public health impact. This design prioritises an initial quantitative phase to establish market scale and characteristics, which then informs a subsequent qualitative phase involving open-ended questions. This integrated approach aims to move beyond mere description, providing a comprehensive understanding of the market's complexities and human impact, and informing contextually sensitive policy interventions.

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Population and Sampling: The target population comprises 80 participants, including unregulated medicinal drug consumers and vendors, regulatory authorities, and registered distributors. A sample size of 51 participants was determined using the Krejcie & Morgan sample calculation.

The study invited the targeted population to complete the questionnaire through a link. The study implemented a Voluntary sampling design (Murairwa, 2015) with a fixed data collection window of two weeks. This is the Time-Limited Voluntary sampling design. The study received 51 fully completed questionnaires in the data collection window for analysis. The study applied strict inclusion criteria, such as being over 18 and operating or residing in Harare CBD.

Data Collection Instruments and Procedure: The study collected data through a questionnaire. The questionnaire, designed using the Likert scale, was distributed electronically to the target population to gather data on medicinal drug sources and distribution networks.

The research used closed-ended and a few open-ended questions for data gathering. The data collection process adhered to strict ethical standards, including informed consent, participant anonymity, confidentiality, and data security measures, with data stored securely for future retrieval upon request.

Data Analysis: The quantitative data were analysed using descriptive statistics, including frequencies and percentages. The qualitative data from open-ended questions were used to explain the findings, develop the framework, and make recommendations.

The study's results were presented using data visualisation techniques (charts, graphs, tables) and narrative to interpret findings and offer actionable recommendations. The study applied the Chi-square test to assess whether the response rates differ, with the hypothesis □0: the response rates are the same versus □1: the response rates are not the same. The Chi-square □2 test (Murairwa, 2019) formula is in Equation 1.

$$\chi^2_{test} = \sum \frac{(O - E)^2}{E}, \tag{1}$$

where χ^2_{test} is the Chi-square test value calculated using Equation 1, E is the expected frequency, and O is the observed frequency.

Ethical Considerations: Informed consent, confidentiality, and minimising potential harm were paramount throughout the study.

Data analysis

The study distributed 80 questionnaires to the regulatory authority officials, registered pharmaceutical distributors, consumers of unregulated medical drugs, and unregistered medicinal drug vendors.

Only 51 completed questionnaires were received in the data collection window, for an impressive response rate of 63.75%. These valid questionnaires were analysed for the study. The study analysed the demographic distribution of the responses and presented the results in Figure 1.

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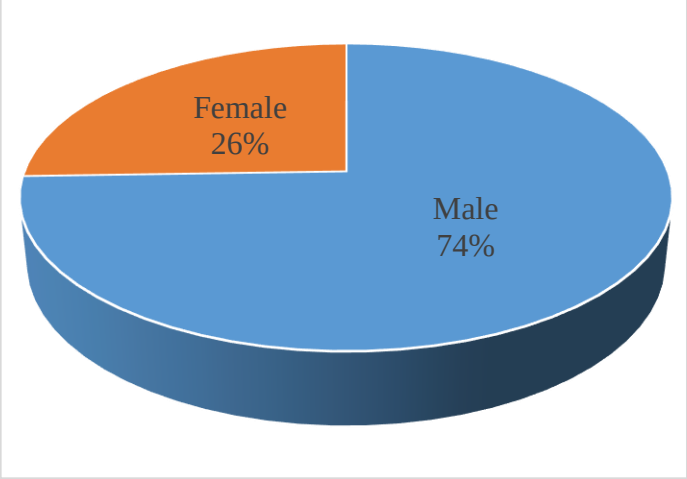


Figure 1: Gender Distribution of the Participants

Figure 1 shows that 74% of the participants were male and 26% were female. This suggests a significantly higher representation of male participants in the study, as confirmed by the Chi-square test results: test statistic Z = -4.847762, p-value = 0.00000124862, 95% region of acceptance = (-1.959964, 1.959964), and p1-p2 = -0.48. Since the p-value = 0.00000124862 < α = 0.05, the null hypothesis that the proportions are the same is rejected. Thus, the proportions are significantly different. The significant gender imbalance means the study's results are heavily biased towards male experiences, potentially overlooking crucial differences in how the studied phenomenon affects women. Thus, the external validity for females is severely limited, making it difficult to generalise conclusions to women or the general public without acknowledging this major skew. This participant imbalance should be considered when interpreting the Zimbabwean informal pharmaceutical market, which was controlled by both local and international actors, as presented in Figure 2.

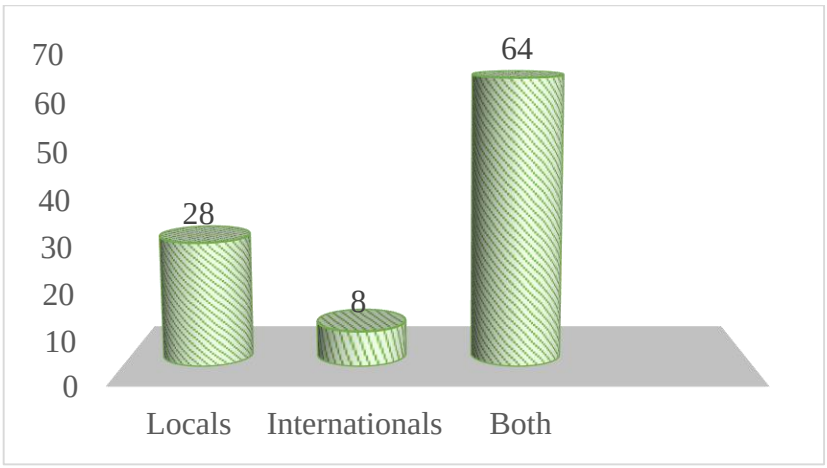


Figure 2: Unregulated Medicinal Drug Actors in Zimbabwe

Figure 2 shows that Zimbabwe's informal pharmaceutical market operates as a hybrid ecosystem rather than being dominated single-dominantly by local or international actors, with cross-border supply chains integrated into domestic retail networks. The relatively small international-only (8%) reflects the risk of direct foreign vending, whereas the Local-only (28%) likely captures traditional/herbal remedies and locally repackaged items circulating through social networks and community informal markets. The results indicate that both local and international actors operate in the Zimbabwean informal pharmaceutical market, supported by a statistically significant Chi-square test, χ^2_{test}= 25.53, p < 0.001. The enforcement that targets only foreign smugglers or only street vendors misses the dominant collaborative model. The effective control would need to disrupt the interface, such as border bribery and truck-driver smuggling, as well as the informal retail nodes, while also addressing demand drivers (stock-outs in public hospitals, high pharmacy prices, and economic necessity) that push patients towards these supply channels. More than 64% of the participants believe that both local and

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international actors control the unregulated pharmaceutical market. The results imply that internationals are suppliers while locals are distributors. If locals are suppliers, then the regulated facilities are smuggling medicinal drugs to the informal markets, because there are very few, if any, unregulated individuals producing medicinal drugs in Zimbabwe. To confirm these discussions about informal pharmaceutical market control, the study investigated the sources of unregulated medicinal drugs and presented the results in Table 1.

Table 1: Sources of Unregulated Medicinal Drugs in Zimbabwe

Source	Percent (%) Response	Rank
Cross-Border Smuggling	82	1
Unregistered Sellers and Syndicates	75	2
Unregistered Herbal Medicines	75	2
Diversion from Clinics and Hospitals	63	4
Other Illicit Substances	47	5

Table 1 results highlight a significant reliance on illicit channels for acquiring substances, with Cross-Border Smuggling (82%) being a major concern among the respondents. This strong consensus suggests that porous borders and inadequate customs controls are the major entry points for unregulated medicinal drugs. The involvement of unregistered sellers and syndicates (75%) and Unregistered Herbal Medicines (75%) further underscores a well-established underground network that facilitates the supply and distribution of these unregulated medicinal drugs. The findings align with Chimhete (2024), who stated that the Medicines Control Authority of Zimbabwe (MCAZ) and the police have cracked down on unregistered herbal clinics, indicating that traditional or herbal remedies can also be part of the informal pharmaceutical market. The suspicion of Diversion of Pharmaceutical Medicines from Clinics and Hospitals (63%) points to systemic vulnerabilities in healthcare facilities to theft, improper dispensing, or corruption. Thus, there are allegations that some medicines are diverted from regulated healthcare facilities for resale in informal pharmaceutical markets in Zimbabwe. These major sources collectively point to a pervasive problem rooted in weaknesses of both internal and external supply chains, ultimately undermining regulatory efforts and public health in Zimbabwe. The Chi-square test results are χ^2_{test} = 11.099 with 4 degrees of freedom, the two-tailed p-value = 0.0255, and at a 5% level of significance, χ^2_{tab} = 9.488. Since $\chi^2_{test} = 11.099 > \chi^2_{tab} = 9.488$, the null hypothesis that the response rates are the same is rejected. Thus, the response rates are not the same across sources of unregulated medicinal drugs in Zimbabwe. The results confirm that some sources of unregulated medicinal drugs are genuinely more prominent when compared to others.

The implications of these findings are quite serious. The high prevalence of Cross-Border Smuggling (82%), Unregistered Herbal Medicines (75%), and Diversion from Clinics and Hospitals (64%) means that a substantial portion of available unregulated medicinal drugs are unregulated, potentially counterfeit, or improperly handled, posing significant health risks to consumers. The Unregistered Sellers and Syndicates (75%) suggest that these networks are deeply embedded and operate with a degree of impunity, making them a spider-web that is challenging to dismantle. While Other Illicit Substances (47%) are reported less frequently, their presence still contributes to a complex landscape of unregulated pharmaceutical medicines. Addressing these issues would require a multifaceted approach, including strengthening border security, implementing stricter controls in healthcare supply and distribution systems, and disrupting informal supply and distribution networks by making medicines available and affordable in regulated healthcare facilities to safeguard public health and ensure the integrity of pharmaceutical drug supply chains. Therefore, the Chi-square test results demand the implementation of differentiated enforcement and continuous surveillance at unregulated medicinal drug supply sources, with

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the highest response rates. The study evaluated the major distribution channels of unregulated medicinal drugs in Zimbabwe and presented the results in Figure 3.

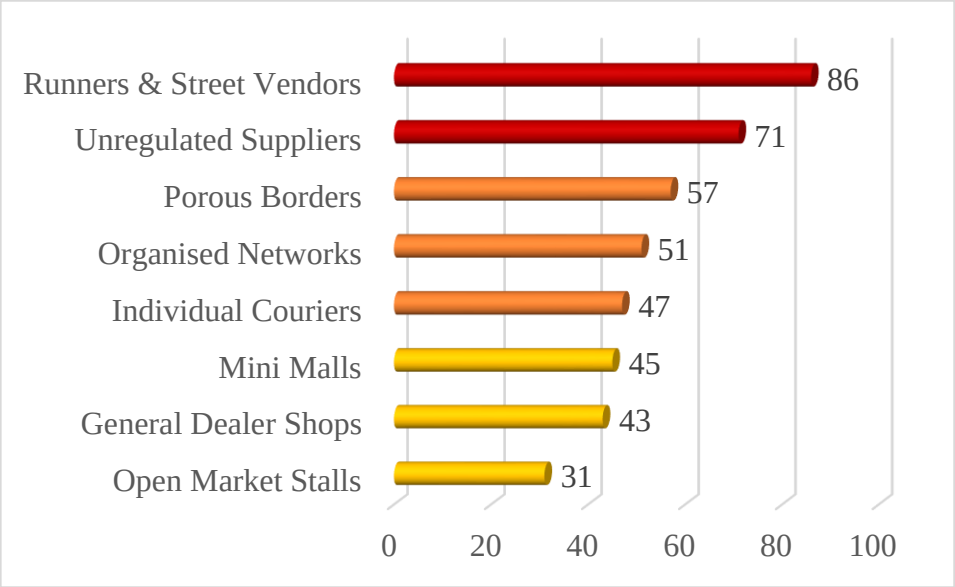


Figure 3: Unregulated Medicinal Drug Distribution Channels

Figure 3 shows results grouped into three tiers: High Prevalence tier (71% - 86%), Middle-tier (47% - 57%), and Low-tier (31% - 45%). The results in Figure 3 indicate a spectrum of activity, ranging from highly visible street operations to more concealed systemic leakages. From the perspective of the dominant High Prevalence (71% - 86%), the unregulated pharmaceutical medicine supply and distribution channels are the Runners and Street Vendors (86%) and Unregulated Suppliers (71%). The Runners and Street Vendors channel (86%) was the most visible and accessible link in the entire unregulated medicinal drugs supply chain from supplier to trafficker to consumer. This high response rate indicates that unregulated medicinal drugs have permeated the public space, moving beyond hidden markets into the open street economy. The Unregulated Private Suppliers (71%) point toward a supply-side failure in the formal healthcare sector. The results suggest that the unregulated pharmaceutical market is not merely relying on the parallel import system but on leakages from the regulated local supply chain, an argument supporting the discussions in Kohler *et al*. (2012). The perspective is that Middle-tier channels, Individual Couriers (47%), Organised Networks (51%), and Porous Borders (57%), represent the logistical backbone of the entire unregulated medicinal drugs supply chain in Zimbabwe. The Lower Tier is the Open Market Stalls (31%), General Dealer Shops (43%), and Mini Malls (45%). The Lower Tier scores could indicate successful law-enforcement crackdowns in public spaces, thereby pushing the distribution into the more hard-to-police mobile runner network, a balloon-squeeze concept. When an air-filled balloon is squeezed in one direction, it changes shape and transfers pressure (problem) to a complicated, harder-to-police area, but it does not burst. This raises a question: "*How do you burst the air-filled balloon by squeezing*?" The answer to this question is to develop an effective strategy that could eliminate the informal pharmaceutical market in Zimbabwe.

Kamat and Nyato (2010) found that unregistered medicine sellers are often the first line of defence for communities' healthcare, a finding supported by the high responses in this study. The unregulated suppliers of medicinal drugs act as mobile pharmacies for consumers. The Runners and Street Vendors' (86%) response rate indicates weak enforcement of the law in Zimbabwe's informal pharmaceutical market. The results support the findings in Kamat and Nyato (2010). The findings on Unregulated Private Suppliers (71%) support those of Mackintosh, Tibandebage, and Kessler (2018), who reported that these suppliers procured drugs from regulated wholesalers through corrupt practices and diversion schemes. The Porous Borders (57%) results concur with the findings in Wertheim *et al*. (2014) that unregulated medicine flows follow colonial trade routes and are exacerbated by weak border controls. The discussion highlights how porous borders facilitate the entry of unregulated medicinal drugs into Zimbabwe's informal pharmaceutical market. The results suggest that the informal pharmaceutical sector is not a marginal activity but a normalised distribution system. With 86% of

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respondents identifying runners and street vendors as preferred channels, this implies that these actors are a standard part of the healthcare landscape. The lower response rates for static locations (Open Market Stalls (31%) and General Dealer Shops (43%)), compared to mobile actors (Runners and Street Vendors (86%)), present a challenge for regulators. Since the informal pharmaceutical market is a balloon filled with air, it requires coordinated, multi-front pressure plus demand-side measures, harmonising enforcement across borders and market segmentation, while expanding access to affordable, quality medicinal drugs, so the profit motive that fuels displacement is eliminated. The study assessed the impact of the informal pharmaceutical market on public healthcare outcomes in Zimbabwe and presented the results in Table 2:

Table 2: The Impact of the Informal Pharmaceutical Market in Zimbabwe

Impact	% Response	Rank
Circulation of Substandard and Counterfeit Medicinal Drugs	82	1
Increased Risk of Adverse Medicinal Drug Reactions	71	2
Misdiagnosis and Inappropriate Treatment	65	3
Antimicrobial Resistance	57	4
Delayed Access to Effective Care	55	5
Erosion of Trust in the Healthcare System	53	6
Lack of Patient Education and Counselling	51	7
Misguided Therapeutic Outcomes	2	8
Eroded Trust between Consumers and Distributors	2	8
Side Effects of an Overdose of Medicinal Drugs	2	8

Table 2 shows three groups of impact channels: High Impact (65% – 82%), Moderate Impact (51% – 57%), and Low Impact (2%). The most critical and immediate threats are Circulation of Substandard and Counterfeit Medicinal Drugs (82%), Increased Risk of Adverse Medicinal Drug Reactions (71%), and Misdiagnosis and Inappropriate Treatment (65%). The dominant is the Circulation of Substandard and Counterfeit Medicinal Drugs (82%). This score is the root-cause indicator. When the unregulated pharmaceutical supply chain is compromised, the immediate clinical manifestation is an Increased Risk of Adverse Drug Reactions (71%). The findings point to a healthcare crisis, with the pharmaceutical supply chain itself becoming a hazard that amplifies downstream harm. A major amplified fatal downstream consequence is antimicrobial resistance: substandard antibiotics with subtherapeutic doses, which help pathogens to survive and evolve.

The moderate impact channels are Antimicrobial Resistance (57%), Delayed Access to Effective Care (55%), Erosion of Trust in the Healthcare System (53%), and Lack of Patient Education and Counselling (51%). The Antimicrobial Resistance (57%) indicates a structural risk of antibiotic resistance, as discussed in Belachew, Hall, and Selvey (2021). The patient's antimicrobial resistance is suspected to have caused the cholera outbreak in Zimbabwe in 2018 and 2019 (Mashe, et al., 2023). The authorities should conduct stewardship campaigns with tighter surveillance of informal pharmaceutical actors, address upstream barriers (stock-outs, cost, and travel distance) that drive consumers to the informal pharmaceutical market, implement transparent enforcement, proportional penalties, and visible quality assurance in formal pharmaceutical facilities and invest in healthy community literacy. The Delayed Access to Effective Care (55%), Erosion of Trust in the Healthcare System (53%), and Lack of Patient Education and Counselling (51%) are conducive conditions for the informal

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pharmaceutical market to thrive, where formal health care feels distant, costly, or absent. In a nutshell, the four moderate-impact channels are interlinked: unregulated access feeds antimicrobial resistance, delays care, signals system weakness (eroding trust), and leaves patients without guidance. Therefore, for the authorities to tackle the informal market, they require both supply-side enforcement and demand-side improvements in accessibility, credibility, and education.

The low-impact channels are Misguided Therapeutic Outcomes (2%), Eroded Trust between Consumers and Distributors (2%), and Side Effects of an Overdose of Medicinal Drugs (2%). The results show that consumers rarely reported wrong drugs for the given symptoms, as indicated by a low response rate for Misguided Therapeutic Outcomes (2%). The results also signal resilient trust between unregulated medicinal drug consumers and suppliers, a sign that the former tolerate risk. The low-impact channels confirm that matching a drug to a complaint was perfect, as supported by an informal pharmaceutical vendor in Hopley, who reported that many who bought the unregulated medicinal drugs reported symptom relief (Masiyiwa, 2025). The results are in line with Stein, Gora, and Macheka's (1989) findings that there was inadequate knowledge of the dangers of using informal, not prescribed, medicinal drugs. They are critical because they reveal which harm channels the informal pharmaceutical market has not perceived as driving at scale, and why it remains marginal in the Zimbabwean context. The authorities' interventions should not assume widespread ignorance of basic indications.

RESULTS DISCUSSION AND INTERPRETATION

The results reveal why a one-size-fits-all command-and-control approach fails in Zimbabwe's informal pharmaceutical market, and they align closely with Responsive Regulatory Theory's (Ayres & Braithwaite, 1992) enforcement pyramid. Figure 2 and Table 1 show a hybrid ecosystem, where 64% of respondents see both local and international actors collaborating, with Cross-Border Smuggling (82%) and Diversion from Clinics/Hospitals (63%). The Responsive Regulatory theory (Ayres & Braithwaite, 1992) argues that regulation should escalate from persuasion to punitive measures based on the actor's behaviour. Yet the data reveal structural leaks at multiple points, such as porous borders, hospital stock-outs, and high pharmacy prices that control demand. For the authorities to target only foreign smugglers or street vendors, as current crackdowns do, misses the dominant collaborative interface and the economic necessity that pushes consumers into informal pharmaceutical channels. The balloon-squeeze effect in Figure 3, where enforcement on static stalls (31%) pushes activity to mobile runners (86%), is exactly what the Responsive Regulatory theory (Ayres & Braithwaite, 1992) predicts when regulators apply pressure without addressing the root incentives. The effective response would require escalating sanctions for corrupt diversion activities in clinics, while simultaneously using persuasive, capacity-building measures at the demand end to make medicinal drugs affordable and available in formal facilities, reducing reliance on runners and unregulated suppliers.

The Institutional theory (Müller, Drouin, & Sankaran, 2019) helps explain the normalisation and persistence of the informal market as a parallel institutional logic. With the Runners and Street Vendors (86%) and Unregulated Private Suppliers (71%) identified as the main channels, the Zimbabwean informal pharmaceutical market is not deviant. Still, it has become a legitimate, taken-for-granted (first line of defence) for Zimbabweans, echoing Oleffe, Sako, Paul, and Mahieu (2022). The middle-tier channels, such as Individual Couriers (47%), Organised Networks (51%), and Porous Borders (57%), show how formal institutional voids in healthcare access are filled by informal rules, roles, and routines. The Social Network Analysis (Moreno, 1934) further clarifies the structure: Figure 2's hybrid model and the spider-web of Unregistered Sellers and Syndicates (75%) indicate dense, embedded ties among cross-border smugglers, truck drivers, clinic staff, and street-level distributors. These networks thrive on trust and reciprocity, which is why eroded trust between consumers and distributors scored only 2% in Table 2. The gender skew in Figure 1, Male Respondents (74%), also suggests male-dominated social networks control both supply and retail nodes, limiting female experiences from shaping policy. Thus, interventions that ignore these relational dynamics and institutional legitimacy are bound to fail, because they will target individuals rather than the network ties and normative expectations that sustain the informal pharmaceutical market in Zimbabwe.

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The Social Determinants of Health (Dahlgren & Whitehead, 1991) reframes the informal pharmaceutical market as a symptom of upstream structural inequities rather than just criminal behaviour. Table 2's high-impact outcomes- Circulation of Substandard/Counterfeit Drugs (82%), Increased Risk of Adverse Reactions (71%), and Misdiagnosis (65%) - are downstream consequences of determinants like poverty, healthcare stock-outs, travel distance, and cost barriers.

The moderate impact factors make this explicit: Delayed Access to Effective Care (55%), Erosion of Trust in the Healthcare System (53%), and Lack of Patient Education (51%) create conditions in which informal pharmaceutical vendors become a rational choice. The diversion from Clinics/Hospitals (63%) and reliance on Cross-Border Smuggling (82%) point to systemic failures in the formal pharmaceutical supply chain and economic policy, not just weak policing. The results depict a dynamic and robust unregulated medicinal drug distribution network.

This aligns with the literature (such as Kohler *et al*. (2012)) arguing that informal pharmaceutical markets are adaptive systems that thrive on failures of the formal health system and leakage from regulated healthcare supply chains. The low score for Misguided Therapeutic Outcomes (2%) shows consumers often get symptom relief, reinforcing dependence despite risks associated with Antimicrobial Resistance (57%). Thus, Social Determinants of Health (Dahlgren & Whitehead, 1991) argue that bursting the balloon requires demand-side interventions: addressing stock-outs, prices, access in public hospitals, and community health literacy. Without tackling these social determinants, enforcement alone will displace the problem, because the economic and health necessity that pushes 86% of consumers to runners will remain.

Framework to Eliminate the Informal Pharmaceutical Market in Zimbabwe

This study's results show that the informal pharmaceutical market was not a law enforcement problem alone. It is a hybrid, demand-driven, socially embedded system sustained by medicinal drugs smuggled across borders and leaks from the formal pharmaceutical supply chain. Figure 4 presents the Informal Pharmaceutical Market Elimination Framework.

CORE FRAMEWORK PRINCIPLES		Differentiated Responsiveness	Legitimacy Before Coercion	Map Networks	Resolve Upstream Causes
RESPONSIVE ECOSYSTEM MODEL	**Tier 1**	FOUNDATION - ADDRESS STRUCTURAL PULL FACTORS			
		Formal Supply Strengthening	Affordability Schemes	Accessibility Schemes	Health Literacy Campaigns
	Tier 2	NETWORK DISRUPTION-TARGET COLLABORATIVE INTERFACE			
		Intelligence-Led Border Operations	Facility-Level Diversion Audits	Syndicate Mapping	Wholesaler Track-and-Trace
	Tier 3	DISTRIBUTION CHANNELS-SPECIFIC REGULATION			
		Mobile Runners: • Restorative plus Pathway to Formal	Unregulated Private Suppliers: • Deterrence	Static Stalls/Shops: • Compliance Assistance	Online/Social Media Vendors: • Swift Prosecution

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	Tier 4	HARM REDUCTION AND MONITORING			
		Community Pharmacovigilance	Antimicrobial Resistance Sentinel Surveillance	Gendered Outreach	Data Dashboard

Figure 4: Zimbabwe Informal Pharmaceutical Market Elimination Framework

The Informal Pharmaceutical Market Elimination framework consists of two major parts: the four core framework principles and a four-tier responsive ecosystem model. The core framework principles emerged from the study's tripartite theoretical framework: macro (Responsive Regulatory and Institutional theories), meso (Social Network Analysis theory), and micro (Social Determinants of Health theory). Each tier of the responsive ecosystem model has four implementable tactics. The Tier 1 strategies address the structural pull factors, such as stock-out, subsidising and pricing, digital accessibility, and lack of counselling. The Tier 2 strategies focus on disrupting distribution networks through applying data-driven evidence, ad hoc diversion audits, enforcing punitive measures, and automating the entire pharmaceutical supply chain. The Tier 3 strategies focus on regulations to formalise (licensing and revocation) some of the informal pharmaceutical outlets. The Tier 4 strategies focus on reducing harm caused by unregulated medicinal drugs and monitoring the informal pharmaceutical market in Zimbabwe. The Informal Pharmaceutical Market Elimination framework would burst the air-filled balloon because it escalates punishment for corrupt actors, targets all stakeholders, and is legitimacy-sensitive and synchronous digital hierarchy–driven.

CONCLUSION AND RECOMMENDATIONS

The study shows that Zimbabwe's informal pharmaceutical market is not a fringe activity but a hybrid ecosystem: jointly run by local and international actors (64%), purely foreign (8%), and purely local (28%). Cross-border smuggling (82%), unregistered sellers and syndicates (75%), unregistered herbal medicines (75%), and diversion from clinics and hospitals (63%) dominated the informal pharmaceutical supply chain. These unregulated sources of medicinal products differ significantly in prominence ($\chi^2 = 11.10$, $df = 4$, $p = 0.0255$). The distribution is most visible through mobile runners and street vendors (86%) and unregulated private suppliers (71%). In comparison, static stalls and shops (31–45%) are less common, suggesting enforcement has squeezed trade into more mobile, harder-to-police channels. The impacts cluster into high (counterfeit/substandard drugs (82%), adverse reactions (71%), misdiagnosis (65%)), moderate (antimicrobial resistance (57%), delayed care (55%), erosion of trust in the system (53%), lack of counselling (51%)), and low (misguided therapeutic outcomes (2%), eroded consumer-distributor trust (2%), and overdose side effects (2%)). Overall, the results point to a normalised, demand-driven pharmaceutical market where porous borders, supply chain leakages, and economic necessity intersect.

The enforcement must target the collaborative interface rather than isolated actors. That means coordinated operations at border posts and known smuggling corridors (truck driver networks and bribery hotspots) paired with audits of regulated pharmaceutical facilities (wholesalers, clinics, and hospitals) to stop diversion (63%). Medicines Control Authority of Zimbabwe (MCAZ) and police clean-ups in hotspots such as Hopley should continue and be conducted more frequently; however, penalties need to be proportional and transparent so they do not simply push vendors into harder-to-police channels, such as mobile-runner networks (86%). For the authorities to disrupt unregistered medicinal drug sellers/syndicates (75%), they will require intelligence-led mapping of syndicates rather than ad-hoc raids, and tighter licensing checks on private pharmaceutical suppliers who leak medicinal drugs into the informal supply chain (71%).

There is a need to reduce the pull factors that make informal channels rational, such as stock-outs, high pharmacy prices, and travel costs, which drive 55% of customers to delay formal care. The authority should expand affordable access through outreach and subsidised essential medicines. Pair this with antimicrobial resistance stewardship and community health literacy, clear dosage guidance, counselling, and pharmacovigilance, since

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

51% reported a lack of patient education and 57% flag antimicrobial resistance risk. The authorities should rebuild trust (53% erosion) via visible quality assurance in public facilities and transparent enforcement, while recognising that consumers already aim for plausible medicines (low 2% misguided outcomes) and retain pragmatic trust in vendors (low 2% consumer-distributor distrust): messages should therefore focus on product quality and safety rather than dismissing vendors outright.

Areas for further studies

The study's sole focus on Harare's CBD restricts the generalisability of its findings. Therefore, future studies could broaden their scope to include all cities or the entire country for more comprehensive insights into the informal pharmaceutical market in Zimbabwe.

ACKNOWLEDGEMENT

The researchers would want to thank the participants who contributed to data collection and all those cited in this study.

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