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From Self-Medication to Antimicrobial Resistance: Socioeconomic Realities and Public Health Implications in Kibera, Nairobi

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Abstract

Self-medication with antibiotics is a widespread practice that significantly accelerates antimicrobial resistance (AMR), particularly in informal settlements such as Kibera, Nairobi. This study carefully collects research from 2016-2025 and uses the Health Belief Model (HBM) to look at the behavioral, environmental, and structural causes of antibiotic misuse. These include widespread poverty, limited access to formal healthcare, unregulated pharmaceutical markets, and poor sanitation. Findings reveal that high perceived susceptibility to infection, limited understanding of AMR severity, and strong confidence in self-diagnosis reinforce habitual antibiotic use. The perceived benefits of informal access—such as affordability, convenience, and social trust—consistently outweigh barriers to formal care, including cost, distance, and long wait times. Social and environmental cues, such as peer influence and poor sanitation, further normalize inappropriate antibiotic use. Despite national estimates of 8500 AMR-attributable deaths in 2019, community awareness of AMR risks remains low. This study adds to the body of research on AMR by combining theory-driven behavioral analyses with policy-relevant insights specific to low-income urban contexts. It highlights the need for multifaceted interventions, including regulatory enforcement, community education, health system expansion, environmental sanitation upgrades, and localized AMR surveillance. Future research should assess intervention effectiveness and develop HBM-aligned communication strategies. A One Health, multisectoral approach is essential to curbing AMR in urban informal settlements like Kibera and similar settings globally.

Keywords

Antibiotic Self-Medication, Antimicrobial Resistance (AMR), Informal Settlements, Health Belief Model (HBM), Urban Health, Kibera, Public Health Behaviour, Community-Based Interventions, Health System Access,

One Health

1. Introduction

This introduction sets the stage for a critical examination of antibiotic self-medication and its role in accelerating antimicrobial resistance (AMR) within Kibera, Nairobi's largest informal settlement. It outlines the global and national burdens of AMR, highlights the unique vulnerabilities of urban slum environments, and contextualizes the study within the socio-economic and infrastructural realities of Kibera. The section further articulates the research problem, justification, objectives, and guiding questions, establishing a foundation for the theoretical and empirical analyses that follow.

1.1. Healthcare Access and Infrastructure in Kibera

Residents of Kibera face considerable barriers in accessing formal healthcare services, largely due to a severe shortage of public healthcare facilities within the settlement. Officially housing approximately 185,000 individuals [1], Kibera is inadequately served by just one government-operated health facility, the Kibera Health Centre, which provides limited basic outpatient care [2]. The absence of public hospitals or comprehensive free clinics necessitates reliance on a fragmented network of private clinics, non-governmental organisations (NGO)-sponsored health posts, and informal drug vendors, which operate under minimal regulation and oversight [3].

This fragmented healthcare infrastructure results in significant variability in the quality of medical care and imposes substantial financial barriers for residents. Out-of-pocket costs, even seemingly minimal fees, often exceed what many residents can afford, causing them to avoid professional medical consultations altogether [4]. Consequently, residents commonly resort to self-medication practices, acquiring antibiotics without prescriptions from unlicensed drug vendors and informal kiosks, thus directly contributing to antibiotic misuse and accelerating antimicrobial resistance (AMR) within the community [5].

Exacerbating the issue, Kibera Health Centre, staffed solely by nurses and clinical officers, can serve only approximately 120 patients weekly [2]. Limited clinic hours, long waits, and physical distance from homes further discourage residents from seeking formal care, steering them toward easily accessible informal drug sellers who dispense medications without medical consultations [6]. Community health volunteers and NGOs attempt to bridge these service gaps but cannot adequately address the extensive healthcare needs. Broader infrastructure problems, like not enough clean water and toilets, raise public health risks, especially diarrhoeal diseases and tuberculosis. This makes people more dependent on antibiotics, which leads to more misuse and AMR [7].

In conclusion, Kibera's poor healthcare infrastructure—limited public facilities,

high costs, and unmet medical needs—makes it common for people to self-medicate with antibiotics and perceive it as necessary, which exacerbates the spread of AMR in the community.

1.2. Problem Statement

Antimicrobial resistance (AMR) poses an escalating global health threat, particularly in resource-limited urban informal settlements like Kibera in Nairobi. Inadequate healthcare infrastructure, economic hardships, cultural practices encouraging antibiotic self-medication, and environmental contamination exacerbate antibiotic misuse, creating a complex public health challenge. Without targeted interventions grounded in a comprehensive understanding of how these interconnected drivers influence one another, AMR will continue to worsen, reducing healthcare effectiveness and deepening health disparities in vulnerable communities.

1.3. Justification for the Research

The escalating challenge of antimicrobial resistance (AMR) represents a significant public health threat, exacerbated by widespread antibiotic self-medication in informal settlements, and requires urgent attention. Kibera, as one of Africa's largest informal urban settlements, provides a critical case study for understanding how socioeconomic disparities, limited healthcare infrastructure, and environmental factors interact to drive antibiotic misuse and resistance. This research addresses a crucial knowledge gap by comprehensively examining the prevalence of self-medication, the underlying socioeconomic and cultural determinants, and the environmental contributors to AMR. Insights gained will inform targeted, culturally sensitive interventions and policies, ultimately aiming to mitigate antibiotic resistance and improve health outcomes both locally and in comparable global settings.

1.4. Research Objectives and Questions

1.4.1. Research Objectives

The study aims to:

1) Assess the prevalence and patterns of antibiotic self-medication practices among residents of Kibera, highlighting the most commonly misused antibiotics and associated ailments.

2) Identify key factors influencing antibiotic misuse, including socioeconomic constraints, barriers to healthcare access, infrastructural deficiencies, and cultural beliefs that shape health-seeking behaviours in the Kibera community.

3) Investigate how environmental conditions, particularly inadequate sanitation facilities and limited access to clean water, contribute to the emergence and transmission of antimicrobial resistance within Kibera.

4) Evaluate community awareness, knowledge levels, and attitudes regarding appropriate antibiotic usage and the implications of antimicrobial resistance.

5) Look into policy interventions and practical public health strategies that are tailored to the Kibera context in order to effectively reduce antibiotic misuse and stop the spread of antimicrobial resistance. Keep in mind that these strategies may not be straightforward to put into action.

1.4.2. Research Questions

Correspondingly, the research seeks to answer several key questions:

1) What is the prevalence and pattern of antibiotic self-medication among Kibera residents?

2) What socioeconomic, infrastructural, and cultural factors influence the decision to self-medicate rather than seek formal healthcare?

3) How do environmental factors, such as poor sanitation and inadequate access to clean water, contribute to the emergence and spread of antimicrobial resistance in Kibera?

4) What are the community's current knowledge, attitudes, and practices regarding antibiotic use and antimicrobial resistance?

5) Which targeted interventions could effectively reduce antibiotic misuse and mitigate antimicrobial resistance in Kibera, and what barriers might challenge their successful implementation?

By answering these questions, the study hopes to get a full picture of how self-medication and the conditions in Kibera are connected to antimicrobial resistance and help come up with solutions that work in this situation.

2. Literature Review and Theoretical Framework

This section reviews existing literature on antibiotic self-medication and antimicrobial resistance (AMR), with particular attention to urban informal settlements in low- and middle-income countries. It brings together real-world evidence about how common antibiotic misuse is, what causes it, and what happens when people don't follow the rules. It also talks about the societal, cultural, and environmental factors that support these behaviours. The section also introduces the Health Belief Model (HBM) as the primary theoretical framework guiding this study, highlighting its relevance for interpreting health behaviours related to antibiotic use within the context of Kibera.

2.1. Review of Relevant Literature

2.1.1. Antibiotic Misuse in Informal Settlements: Prevalence and Patterns

Antimicrobial resistance (AMR) has emerged as a critical global health challenge, and the misuse of antibiotics in community settings is a major driving factor, particularly in low- and middle-income countries (LMICs) [8]. Weak regulatory enforcement in many LMICs makes it easy to obtain antibiotics without a prescription, leading to widespread self-medication [9]. Urban informal settlements (slums) like Kibera in Nairobi, Kenya, exemplify this problem. These settlements are characterised by dense populations, poverty, and limited healthcare infrastructure—conditions that facilitate frequent infections and increased use of antibiotics [3].

Antibiotics are often purchased from pharmacies or informal drug sellers without medical oversight, sometimes even in partial doses because patients cannot afford full courses [6]. Such practices contribute to improper antibiotic use and selection for resistant pathogens in the community.

Multiple studies document the high prevalence of antibiotic misuse in informal settlements. In Kibera, Omulo *et al.* (2017) found that 87% of surveyed households had used an antibiotic in the past 12 months, frequently to treat ailments like colds, coughs, and fevers that may not require antibiotic therapy [3]. Notably, 66% - 74% of respondents in that study mistakenly believed that antibiotics are effective for illnesses such as the common cold or flu, underscoring prevalent misconceptions about appropriate antibiotic use. Most Kibera residents obtained their antibiotics either from local clinics or over-the-counter at pharmacies, reflecting a mix of formal and informal access. High rates of non-prescription antibiotic use are not unique to Kenya. For example, a recent survey of two slum communities in northern Ghana found that 30.9% of households had taken antibiotics without a prescription in the preceding month [10]. Many of these Ghanaian residents relied on informal advice from friends or family and obtained antibiotics from private drug shops, saved leftover pills, or even itinerant drug hawkers. Other LMIC settings have reported extreme levels of unsupervised antibiotic consumption. 79% of people who lived in a slum in Lagos, Nigeria, said they had recently used an antibiotic that contained ampicillin and cloxacillin. More than half also said they had recently used tetracycline or metronidazole [11].

A systematic review by Ocan *et al.* (2015) further corroborates the ubiquity of this issue: on average about 38.8% of people in developing countries engage in antimicrobial self-medication [9]. Common symptoms prompting such use include respiratory infections, fever, and gastrointestinal ailments, and the primary sources of the drugs are pharmacies and leftover medications from previous treatments. We frequently noted inappropriate practices such as failing to complete prescribed courses and sharing antibiotics, which compounded the risk of resistance development. Taken together, the literature indicates that antibiotic misuse—particularly unprescribed consumption—is highly prevalent in high-density, low-income communities like Kibera and is increasingly documented in comparable informal settlements in other LMICs.

2.1.2. Socioeconomic, Environmental, and Cultural Drivers of AMR in Low-Income Communities

The drivers of antibiotic misuse and subsequent AMR in informal settlements are multifaceted, spanning socioeconomic, environmental, and cultural factors. Limited access to affordable healthcare is a key driver. Residents of settlements such as Kibera often face barriers to seeking timely care from qualified providers—clinics may be distant, overcrowded, or costly, and taking time off work for medical visits can impose financial hardship. As a result, people turn to more convenient alternatives. Qualitative research from East Africa shows that many people avoid clinics and treat themselves with drugs that are easy to get [3] [4] because they

think the formal healthcare system is inconvenient or expensive, or because they don't have time.

Indeed, in these settings, one can easily purchase antibiotics without a prescription from private pharmacies or informal drug shops. Community "pharmacists" (who are sometimes unlicensed medicine vendors) play an outsized role in advising and selling antibiotics to the public [12]. Close to 70% of Kibera households, for instance, reported initially consulting such community drug sellers for illnesses, effectively engaging in pharmacist-guided self-medication [9]. The economic incentive structure also contributes to misuse: in impoverished settlements, patients may buy a few pills at a time ("in bits") if they cannot afford a full course, leading to incomplete treatment [5]. Poverty and the need to ration limited funds drive this practice, but unfortunately, it fosters partial dosing, allowing resistant organisms to thrive.

Cultural norms and knowledge gaps further influence antibiotic use patterns. Misconceptions about antibiotics are widespread in informal communities. As noted above, many Kibera residents believed antibiotics could cure viral colds [3]. Such misunderstandings reflect gaps in health education. In the Kibera study, fewer than half of respondents recalled receiving any information on proper antibiotic use in the past year [6]. This lack of awareness is common in underserved areas, where public health education campaigns are scarce and pharmacy vendors often do not counsel clients on appropriate use. At the same time, trust in informal advice networks is high—people often rely on recommendations from relatives, friends, or neighbours who have used certain antibiotics before [13].

These social practices, combined with the perception that antibiotics are a quick cure for any significant illness, drive repeated cycles of self-medication. Surveys in African slums have documented that it is relatively common for individuals to save leftover antibiotics from a previous illness or to obtain pills from someone they know, instead of consulting a clinician [10]. These social practices, combined with inadequate training for healthcare personnel, reinforce improper antibiotic habits both in clinics and in the community. For example, a Kenyan hospital survey found that only 14% of resident doctors had recent formal training on proper antibiotic use [7].

Environmental conditions in informal settlements create an additional layer of AMR risk. Overcrowding, inadequate sanitation, and poor water quality are hallmark challenges in slums like Kibera, and they facilitate the spread of infectious diseases and drug-resistant organisms. Densely populated living quarters and communal facilities mean that pathogens can transmit rapidly from person to person. Lack of clean water and proper waste disposal leads to faecal contamination in the environment, which is particularly problematic for the spread of resistant bacteria. A recent study of Kibera found that over 80% of Escherichia coli isolates from residents' household samples were already resistant to three or more antibiotic classes [6]. This result suggests that a reservoir of resistant bacteria is present in the community.

Environmental pathways likely play a significant role in sustaining such reservoirs. Unsanitary conditions—such as open sewage and unregulated waste— enable resistant strains to circulate via water, food, and surfaces. Omulo *et al.* (2021) observed that, in Kibera, environmental transmission of resistant bacteria appeared to "overwhelm" the effects of individual antibiotic use, meaning that even families that used antibiotics appropriately could be colonised by resistant microbes shed by others [6]. This aligns with broader evidence that suboptimal water, sanitation, and hygiene (WASH) infrastructure exacerbates AMR concerns by creating conditions conducive to the proliferation of hard-to-eradicate pathogens [7]. So, there are two types of risks in informal settlements: first, the overuse of antibiotics creates selective pressure, and second, the crowded, dirty environment speeds up the spread of strains that are resistant.

2.2. Theoretical Framework: Health Belief Model (HBM)

This study adopts the Health Belief Model (HBM) as a theoretical framework to analyse behavioural factors influencing antibiotic misuse and self-medication practices among Kibera residents. According to the HBM, health-related behaviours are affected by several cognitive perceptions, including perceived susceptibility (beliefs about the chance of getting an illness), perceived severity (beliefs about how serious the illness is and what effects it might have), perceived benefits (beliefs about how effective a health action is), perceived barriers (beliefs about the physical and mental costs of the action), cues to action (external and internal triggers that make someone do the health behaviour), and self-efficacy (confidence in one's ability to do the health behaviour) [14].

Kibera residents face a high perceived susceptibility to common infectious diseases, such as diarrhoea and respiratory infections, due to environmental factors. Despite this, many residents still don't think that not seeing a doctor or the risks of AMR are very bad. They don't see the link between using antibiotics in the wrong way and possible future treatment failures [13].

The perceived benefits of self-medication significantly outweigh perceived barriers in Kibera. Residents commonly view obtaining antibiotics from informal drug sellers as convenient, cost-effective, and quickly effective. In contrast, significant barriers to accessing formal healthcare services include direct costs such as consultation fees and transportation, indirect costs like lost working hours, and negative experiences due to understaffed and overcrowded clinics [4] [5].

Cues to action and high self-efficacy further reinforce self-medication practices. Social interactions frequently provide cues, as neighbors and family members readily share informal medical advice. Additionally, leftover antibiotics stored at home serve as immediate triggers for self-medication at the onset of similar symptoms. The widespread availability of antibiotics in informal kiosks normalizes their use, bolstering residents' confidence in self-diagnosing and treating common ailments [13].

While HBM provides valuable insights, it primarily emphasizes individual-level

cognition and does not fully capture communal and social influences. Thus, complementary theoretical perspectives such as the theory of planned behavior (highlighting subjective norms) and social cognitive theory (emphasizing observational learning) are integrated to provide a more comprehensive analysis. This approach acknowledges the significant role of community norms and collective behaviors in shaping health practices, particularly in Kibera's socially cohesive environment [15] [16].

In conclusion, HBM, enhanced by supplementary theories, offers a robust framework for understanding why Kibera residents engage in antibiotic misuse through self-medication, highlighting areas for targeted interventions that could shift perceptions and behaviours towards safer antibiotic use practices.

3. Methods

This systematic review employed an integrative design guided by the Health Belief Model (HBM), which provides a conceptual framework for examining individual and collective antibiotic use behaviours in Kibera, Nairobi. The HBM posits that health behaviour is shaped by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues for action, and self-efficacy [14]. So, the literature was chosen, put together, and analysed in a way that looked at how these six concepts affect people self-medicating and abusing antibiotics in an informal settlement.

3.1. Literature Search and Selection

A comprehensive search was conducted across multiple databases—PubMed, Google Scholar, Web of Science, and Scopus—as well as grey literature repositories from the World Health Organisation (WHO), the Centres for Disease Control and Prevention (CDC), and Kenya's Ministry of Health. Search terms included combinations of "self-medication", "antibiotic misuse", "antimicrobial resistance", "Kibera", "Nairobi", "informal settlements", "low-income urban health", "environmental contamination", and "Health Belief Model".

We included studies published between January 2016 and March 2025 if they met the following criteria:

- Examined self-medication, AMR, or antibiotic use in Kibera or comparable informal settlements in low- and middle-income countries (LMICs);
- Provide quantitative or qualitative data on behaviour, knowledge, environmental factors, or microbial resistance patterns;
- Were published in English in peer-reviewed journals or as credible institutional reports;
- The study demonstrated methodological rigour and relevancy to the HBM framework.

Exclusion criteria encompassed studies that focused solely on rural populations, lacked primary data, or predated 2016.

3.2. Data Extraction and Thematic Coding

Two independent reviewers extracted data on population characteristics, antibiotic use patterns, microbiological findings, and environmental determinants. Any disagreements were resolved by consensus. We categorised the extracted data into thematic domains using the HBM constructs.

- Perceived susceptibility and severity: evidence on community risk perceptions and understanding of AMR threats;
- Perceived benefits and barriers: motivations for self-medication versus seeking formal care;
- Cues to action: social, environmental, and informational triggers that influence antibiotic use;
- Self-efficacy: confidence in one's ability to self-diagnose and treat infections.

This deductive coding approach enabled triangulation between theoretical constructs and empirical findings.

3.3. Quality Appraisal

Quantitative studies were appraised using a modified Newcastle-Ottawa Scale [17], assessing study design, outcome measurement, and risk of bias. Qualitative studies were evaluated using the Critical Appraisal Skills Programme (CASP) checklist (CASP, 2018). Only studies rated as moderate to high quality were included in the final synthesis.

3.4. Synthesis and Analytical Integration

Findings were synthesised narratively and mapped to the HBM to clarify the behavioural mechanisms driving antibiotic misuse in Kibera. For instance, data on widespread beliefs that antibiotics cure colds and flu [3] [13] were interpreted as reflecting low perceived severity of inappropriate antibiotic use. Long wait times and high healthcare costs were seen as barriers to self-medication [4], while the use of peer advice and leftover antibiotics were seen as strong cues to action [5] [13].

This model-based mapping was improved by taking into account things like poverty, gender norms, infrastructure, and informal drug economies. This made the explanations more general than just individual cognition, which is in line with criticisms that HBM alone may not fully capture social factors [15] [16].

3.5. Inclusion of Microbiological and Environmental Data

Studies reporting antimicrobial susceptibility testing (AST) results and environmental contamination with resistant bacteria were included to link behavioural patterns with microbiological outcomes. Omulo *et al.* (2021), for example, discovered that more than 80% of Escherichia coli isolates from homes in Kibera were resistant to three or more antibiotic classes [6]. This suggests that people repeatedly self-medicating in unsafe environments keeps resistance cycles going.

We assessed studies on environmental hygiene, such as sanitation infrastruc-

ture and water access, to contextualise perceived susceptibility and reinforce environmental cues to action. For instance, households using open defecation or shared latrines had significantly higher rates of multidrug-resistant bacteria [6] [7], reinforcing perceived susceptibility yet paradoxically fostering resignation and normalising antibiotic use.

3.6. Policy and Intervention Review

Documents detailing intervention strategies—both local and international—were reviewed for alignment with the HBM framework. For example, community-based educational programmes were assessed for their effectiveness in shifting perceived benefits and increasing self-efficacy regarding appropriate antibiotic use [8] [12].

Where relevant, best practices from other LMICs (e.g., India's Red Line campaign or Vietnam's pharmacist-led stewardship programs) were compared to Kibera's conditions to assess adaptability and sustainability.

4. Results

This section presents findings on self-medication and antimicrobial resistance (AMR) in Kibera, interpreted through the lens of the Health Belief Model (HBM). Six core constructs—perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues for action, and self-efficacy—provide a framework for understanding community behaviours, while empirical subthemes are preserved to maintain clarity and rigour.

4.1. Prevalence of Self-Medication

Self-medication with antibiotics is widespread and normalised in Kibera. Across multiple studies, between 87% and 90% of residents reported recent antibiotic use without prescriptions [3] [5]. Omulo *et al.* (2017) noted that antibiotics were often used to treat non-bacterial illnesses such as the common cold, flu-like symptoms, and mild fevers [3]. The most commonly misused antibiotics include ampicillin, cotrimoxazole, tetracycline, and metronidazole, frequently sold over the counter in informal drug shops or kiosks without dosage guidance or diagnostic confirmation.

This trend is not unique to Kibera. In a comparable setting in Lagos, Nigeria, 79% of respondents reported using antibiotics without prescriptions [11], while 30.9% of slum residents in Ghana had taken antibiotics without consulting a doctor in the previous month [10]. These findings underscore the ubiquity of informal antibiotic use across urban informal settlements in Africa.

In Kibera, young adults aged 15 - 35 are especially prone to self-medicating, often using Google, social media, and mobile apps to self-diagnose and select medications [5]. Antibiotics are stored in homes for repeated use, and peer networks act as de facto health advisors—amplifying both the reach and normalization of self-medication (**Figure 1**).

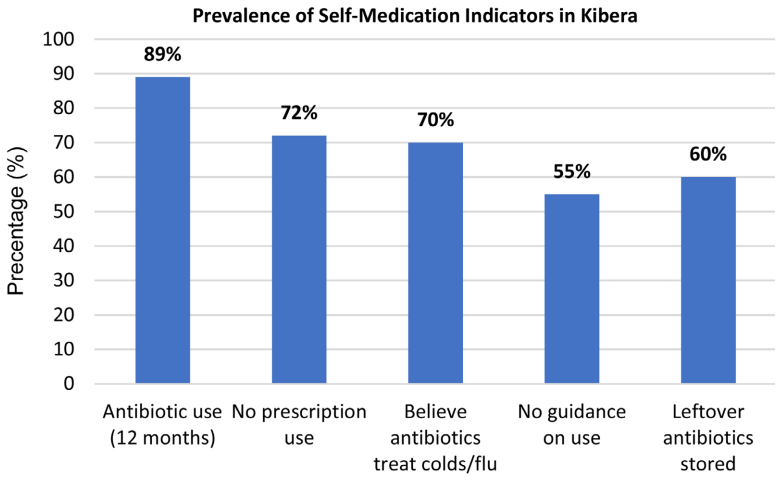

Figure 1. Prevalence of Self-Medication Indicators in Kibera. Source: Omulo *et al.*, 2017; Karimi *et al.*, 2023; Ocan *et al.*, 2015. Note: The most commonly misused antibiotics include ampicillin, cotrimoxazole, tetracycline, and metronidazole, which are frequently sold by informal drug vendors or kiosks without proper dosage guidance—driven by accessibility, affordability, and trust in sellers. Youth aged 15 - 35 who engage in self-medication often rely on internet sources or peer advice for self-diagnosis.

4.2. Perceived Susceptibility: Recognition of Disease Risk

Residents of Kibera are acutely aware of their heightened risk of infectious disease, driven by overcrowded housing, poor sanitation, and inadequate access to clean water. Studies have consistently linked these environmental stressors with increased antibiotic use. For example, in Kibera, over 80% of household samples contained multidrug-resistant *E. coli* [6]. Children playing in contaminated soil and adults using shared sanitation facilities face persistent exposure to resistant microbes.

During dry seasons, the concentration of AMR pathogens increases, and transmission becomes more localised and intense due to poor waste management and water scarcity [6]. In Kisumu's informal settlements, 99.8% of households relied on groundwater, much of it contaminated by pit latrines and open sewage, leading to recurrent gastrointestinal infections and escalating antibiotic use [5].

Community members understand that infection is likely—but associate the fact primarily with the need for immediate treatment, not necessarily with preventive strategies. This vulnerability perception feeds habitual self-medication behaviours.

4.3. Perceived Severity: Underestimation of AMR Consequences

Despite high antibiotic usage and repeated illness cycles, community understanding of the severity and long-term consequences of antimicrobial resistance remains limited. In Kibera, only a minority of residents recognised AMR as a health threat, with many mistakenly believing that antibiotics cure viral infections [3] [13]. Misuse is compounded by a lack of education on completing full courses or avoiding

antibiotic sharing.

Yet, the burden of AMR in Kenya is growing rapidly. In 2019, an estimated 8500 deaths were directly attributable to AMR, with Kibera likely contributing significantly due to its high population density and unregulated antibiotic use [18]. A 2022 study found that Vibrio cholerae strains in Nairobi were resistant to 10 antibiotics, including critical frontline drugs [17]. These facts are largely unknown at the community level, where residents often interpret treatment failure as a misdiagnosis or a need for stronger drugs, rather than a consequence of resistance.

4.4. Perceived Benefits: Self-Medication as a Rational Choice

In a structurally marginalised community like Kibera, self-medication is seen not only as convenient but also logically necessary. Antibiotics are perceived as fast-acting, affordable, and reliable remedies, available without bureaucratic delays. Informal drug vendors—often known and trusted within the neighborhood—serve both as suppliers and as advisors [3] [12].

Karimi *et al.* (2023) found that many residents purchased antibiotics in small doses, often only one or two pills at a time, due to financial constraints [5]. These fragmented treatment regimens contribute to suboptimal outcomes and AMR emergence. Yet the perceived effectiveness of even partial dosing reinforces trust in the method.

Similar trends are observed in Ghana, Uganda, and Tanzania, where community-level "pharmacists" advise patients on antibiotics based on anecdotal knowledge rather than clinical diagnostics [9] [10]. In Kibera, antibiotics are treated as general-purpose health tools—used for everything from sore throats to stomach cramps—further solidifying their status as essential, multipurpose medicines in the informal care system (**Table 1**).

Table 1. Inferred trends in AMR-related mortality in Kibera, Nairobi (2016-2025).

Year	Estimated AMR-Related Deaths	Key Pathogens Involved	Contributing Factors	Notable Events/Studies
2016	~400 - 500 (inferred)*	*E. coli*, *K. pneumoniae*, *S. Typhi*	High self-medication rates, poor sanitation	Baseline high antibiotic use reported by Omulo *et al.*, 2017
2017	~500	Same as above	Informal pharmacies, community transmission	MSF reports continued MDR-TB presence in Kibera clinics
2019	~600 - 700	*S. pneumoniae*, *S. aureus*, *K. pneumoniae*	Pediatric pneumonia, typhoid resistance spikes	IHME (2023): 8500 AMR deaths nationally, Kibera inferred to contribute disproportionately
2021	>700	Multidrug-resistant *E. coli*, *Salmonella*	Increased resistance found in household samples	Omulo *et al.* (2021) reports 80% MDR *E. coli* in Kibera
2022	~800	Resistant *V. cholerae*, *E. coli*, *S. Typhi*	Cholera outbreak, AMR environmental spread	Weill *et al.* (2024): Kenya cholera strain resistant to 10 antibiotics

Continued

2025	>900 (projected)	Escalating MDR organisms	Limited policy enforcement, persistent misuse	No major interventions implemented; rising informal antibiotic use

Notes: 1) We estimate figures based on national AMR burden (IHME, 2023), urban slum population ratios, and community-specific data from Kibera-focused studies. 2) These are not official death counts but research-based approximations to reflect trends and public health risk in Kibera. 3) Data highlight that AMR mortality is rising, particularly due to increasing resistance to common community pathogens and persistent environmental exposure.

4.5. Perceived Barriers: Structural and Economic Impediments to Formal Healthcare

Barriers to accessing formal medical services are profound and systemic. Kibera, with over 185,000 official residents and likely many more unofficial inhabitants, is served by only one government health centre, which accommodates roughly 120 patients per week [1] [2]. The clinic's limiting queues and lack of diagnostic capacity further discourage attendance.

Out-of-pocket costs—even small ones—are prohibitively high for many households, and the indirect costs of missing work or childcare duties also weigh heavily [4]. In such a context, self-medication becomes a strategic adaptation to institutional neglect.

According to Kimani-Murage *et al.* (2014), many Kibera families live on less than $2 per day, making even subsidised care inaccessible [19]. As a result, informal providers—who are more affordable, accessible within the community, and often operate beyond standard hours—present a more practical, though riskier, alternative to formal healthcare.

4.6. Cues to Action: Social and Environmental Triggers

Cues to action for antibiotic use are constant and multifaceted. On a social level, relatives, neighbors, and informal drug vendors frequently recommend antibiotics, creating a feedback loop of peer-driven health decisions [13]. Residents often share leftover pills or repeat previous regimens based on symptom similarity.

Environmentally, persistent sanitation problems—open drains, overflowing pit latrines, and water scarcity—act as ongoing cues, reminding residents of their vulnerability to illness. For example, during Nairobi's dry season, the dust and uncollected waste increase respiratory illnesses, prompting increased antibiotic consumption even when symptoms may be viral [6].

The visible illness burden—particularly among children—reinforces the perception that immediate action is necessary, with antibiotics becoming the default solution.

4.7. Self-Efficacy: Confidence in Self-Diagnosis and Treatment

High self-efficacy is a hallmark of health-seeking behaviour in Kibera. Many residents feel confident in identifying common illnesses and selecting the appropriate antibiotics without professional input. Young people, in particular, rely on mobile

apps, Google searches, or social media platforms to self-diagnose, while older residents turn to experiential knowledge or community advice [5].

Unlicensed drug vendors, though not medically trained, are considered reliable and accessible. In the absence of formal regulation, they provide dosage recommendations, suggest brands, and occasionally explain side effects—actions that further legitimise their role in community healthcare [12].

This informal infrastructure reinforces individual and collective self-efficacy, making self-medication not only viable but perceived as more efficient and empowering than formal channels. However, this confidence often leads to incorrect dosing, improper drug selection, and the ongoing circulation of resistant pathogens (Table 2).

Table 2. Synthesis of HBM constructs in the Kibera context.

HBM Construct	Observed Behaviours and Evidence from Kibera
Perceived Susceptibility	The prevalence is elevated due to environmental exposures, Poor sanitation, and endemic infectious disease burden.
Perceived Severity	The impact of AMR mortality is generally underestimated, and there is limited community awareness of the consequences of treatment failure.
Perceived Benefits	There is a high trust in informal vendors and a strong belief in antibiotics as fast, effective, and accessible solutions.
Perceived Barriers	High costs, long queues, and limited capacity at public clinics deter formal healthcare-seeking behavior.
Cues to Action	Illness recurrence, poor hygiene, social influence, and leftover medications trigger habitual self-medication.
Self-Efficacy	There is strong community confidence in self-diagnosis and treatment, reinforced by the use of digital tools and local advice networks that promote self-reliance.

5. Analysis

The health belief model (HBM) reveals how individual perceptions, structural barriers, social norms, and environmental contexts interact to influence antibiotic misuse and the spread of antimicrobial resistance (AMR) in Kibera. This section analyses the drivers of AMR across the six key constructs of the HBM: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

5.1. Perceived Susceptibility: Infection Exposure in Resource-Constrained Environments

Residents of Kibera demonstrate high perceived susceptibility to infectious diseases due to structural and environmental vulnerabilities. Overcrowded living conditions, limited clean water, and inadequate sanitation create daily exposure to pathogens. These worries are backed up by facts: more than 80% of *E. coli* iso-

lates from homes in Kibera were resistant to three or more antibiotic classes. This shows that resistant strains are well established in the community [6].

The widespread contamination of water and food supplies exacerbates this vulnerability. A study in Kisumu found that 99.8% of households rely on groundwater, which is often exposed to sewage from pit latrines [5]. These environmental realities shape a community-wide perception that illness is both inevitable and frequent, reinforcing the belief that early and repeated antibiotic use is necessary.

5.2. Perceived Severity: Disconnect between Misuse and Consequences

Despite high exposure to infection, most Kibera residents underestimate the severity of AMR. The belief that antibiotics are universally curative—even for viral infections—reflects widespread misinformation. In one study, 66% - 74% of participants believed antibiotics could treat colds or flu [3], and fewer than half associated incomplete courses with resistance [6].

This knowledge gap obscures the long-term public health implications of AMR. In 2019 alone, AMR accounted for 8500 deaths in Kenya, with an additional 37,300 associated fatalities [18]. Severe outbreaks in Nairobi's informal settlements have been linked to antibiotic-resistant strains of *Vibrio cholerae*, *Klebsiella pneumoniae*, and *E. coli*. One cholera strain from 2022 was not easily killed by 10 antibiotics [17]. However, the community has not widely internalized these risks [17] to ongoing misuse and delaying the adoption of safer behavior.

5.3. Perceived Benefits: Rationalizing Informal Antibiotic Use

The high perceived benefits of self-medication strongly reinforce non-prescription antibiotic use. Residents frequently view antibiotics as fast-acting, accessible, and affordable, particularly when sourced from informal vendors. Studies show that 70% of residents in East African urban slums obtain antibiotics without prescriptions, often purchasing incomplete courses due to cost constraints [5] [12].

Culturally, antibiotics are perceived as multi-use "cure-all" solutions for a wide range of ailments. This belief is reinforced by past experiences of symptom relief, trust in community vendors, and the urgent need for cost-effective health solutions. In Kibera, where public clinics are overcrowded and difficult to access, informal access to antibiotics is seen not as irresponsible but as pragmatic and necessary [3] [4].

5.4. Perceived Barriers: Systemic Failures in Formal Healthcare Access

Perceived and actual barriers to accessing formal healthcare are major drivers of antibiotic misuse. Kibera's government-run health, serving over 185,000 residents can only treat approximately 120 patients per week [2], resulting in long wait times, limited drug availability, and insufficient diagnostic services. The cost of care including transport and lost wages, further deters clinic visits, especially among those earning less than $2 per day [19].

These constraints shape rational decisions to seek care from informal sources. Informal drug vendors operate near homes, charge less, and provide medications without requiring consultations. As a result, residents weigh the high opportunity costs of formal care against the relative ease of self-medication—and often choose the latter [4]. These systemic barriers have transformed antibiotic self-medication into a default mode of care in the absence of viable alternatives.

5.5. Cues to Action: Social Influence and Environmental Risk

Social norms and environmental conditions serve as powerful cues to action, prompting frequent antibiotic use. Kibera residents often initiate treatment based on informal advice from family, friends, or community drug sellers, who are considered more approachable and responsive than formal healthcare providers [13]. Leftover antibiotics stored at home also serve as immediate visual cues, encouraging reuse without medical input [5].

Environmental degradation plays a reinforcing role. The lack of adequate waste management, overflowing pit latrines, and visible illness within the community continually remind residents of infection risk. Seasonal cues also matter: resistance rates increase during dry periods when contamination concentrates in limited water sources [6]. In such a setting, antibiotic use becomes a preemptive or routine behavior—driven less by diagnosis and more by perceived necessity to prevent or manage illness.

5.6. Self-Efficacy: Community Confidence in Self-Management

High self-efficacy significantly sustains self-medication in Kibera. Residents express strong confidence in their ability to identify symptoms and select appropriate treatments, especially for recurring ailments. Among youth, this confidence is bolstered by mobile phone access and online health content. Among older residents, experiential knowledge and community-shared practices support decision-making [5].

Informal vendors further enhance this confidence by offering tailored advice and flexible purchasing options. These vendors often function as de facto healthcare providers, particularly where public systems are absent or underperforming [12]. As a result, many residents do not perceive the need for formal consultations—especially when informal treatment has "worked" before.

However, this self-efficacy is rarely accompanied by biomedical knowledge, leading to improper drug selection, underdosing, and continued circulation of resistant pathogens. While empowering in some ways, this confidence exacerbates AMR risks when not paired with health literacy or stewardship.

5.7. Integrative Analysis: Intersection of Individual Beliefs and Structural Inequities

Taken together, the HBM analysis reveals a complex interplay between individual perceptions and systemic inequities contribute to AMR in Kibera.me of constrained choices, limited healthcare access, and deeply embedded norms around

self-care. Residents perceive themselves as highly susceptible to infection, but not necessarily to the long-term consequences of resistance. They perceive substantial benefits—and minimal immediate barriers—to self-medication, especially in the absence or dysfunction of formal healthcare systems.

These results are similar to those from other LMICs where people use antibiotics because they have to, not because they don't know any better, but because they have to adapt to failing institutions [9] [20]. Therefore, behavior change strategies must extend beyond information campaigns. They must engage structural determinants, address gaps in the health system, and empower communities with both tools and alternatives for safer health-seeking behavior.

5.8. In-Depth Interpretation of the Results

The preceding analysis illustrates that antibiotic misuse in Kibera is a function of both individual health beliefs and broader systemic failures. Within the Health Belief Model (HBM), self-medication is not merely the result of misinformation but a rational and adaptive strategy in the context of constrained access, environmental risk, and normalized informal care.

Residents exhibit a high perceived susceptibility to illness, which aligns with objective indicators—such as widespread contamination and high AMR carriage. However, the perceived severity of AMR remains low, as many residents have not personally experienced treatment failure and remain unaware of the national mortality burden. This gap reflects a broader failure in public health communication.

The perceived benefits of informal antibiotic use—especially affordability and convenience—outweigh the perceived risks or barriers to misuse. Prior successful experiences, vendor trust, and peer influence reinforce these benefits. Meanwhile, systemic barriers such as cost, long wait times, long wait times, and under-resourced clinics further institutionalise default behaviour.

Social cues and environmental stressors amplify these behaviours. Antibiotic use is so common that it becomes preventive or habitual. Self-efficacy—while high—rests more on communal experience and vendor guidance than clinical knowledge, leading to widespread inappropriate antibiotic use.

These findings align with research from other LMIC contexts, where AMR drivers include fragmented health systems, poverty, and the social normalisation of informal care [9] [20]. Therefore, policy interventions must be multifaceted: increasing awareness of AMR consequences, strengthening formal care systems, regulating informal drug markets, and promoting community-based stewardship strategies. Behaviour change cannot occur in isolation from structural transformations.

6. Discussion

6.1. Synthesis of Results and Analysis

This study applied the Health Belief Model (HBM) to synthesise and interpret the

behavioural, structural, and environmental drivers of self-medication and antimicrobial resistance (AMR) in Kibera, Nairobi. The synthesis of results and analyses reveals how health beliefs are shaped by poverty, limited access to formal healthcare, misinformation, and community norms—factors that collectively sustain high-risk behaviours related to antibiotic misuse. We revisit the key constructs of the HBM below to contextualise and interpret the findings within a coherent framework.

6.1.1. Perceived Susceptibility and Perceived Severity

Kibera residents exhibit high perceived susceptibility to infections, a belief supported by objective indicators of environmental risk. Over 80% of Escherichia coli samples from the community were resistant to more than one drug, showing that AMR pathogens are common [6]. Poor sanitation, contaminated groundwater, and overcrowded housing elevate exposure to enteric and respiratory pathogens. In similar settings like Kisumu, 99.8% of households relied on groundwater that was highly susceptible faecal contamination, increasing illness incidence and reinforcing the perceived need for frequent antibiotic use [5].

Despite this, the perceived severity of AMR remains low. Studies in Kibera and other informal settlements found that 66% - 74% of residents incorrectly believed that antibiotics could treat viral infections, and only a minority understood the link between misuse and resistance [3] [13]. This mismatch between actual and perceived severity is significant; AMR was directly responsible for 8500 deaths in Kenya in 2019, with 37,300 associated fatalities [18]. The lack of visible or immediate consequences of AMR, such as treatment failure or death, contributes to the underestimation of its threat.

6.1.2. Perceived Benefits and Barriers

The perceived benefits of self-medication with antibiotics are deeply entrenched. Informal sources—drug vendors, chemists, and kiosks—offer affordability, convenience, and rapid access, factors highly valued in a setting where public clinics are under-resourced. For instance, Kibera's main government health centre serves an estimated 185,000 people but can only treat 120 patients per week, resulting in long wait times, overcrowding, and inadequate diagnostics [1] [2]. These systemic shortcomings represent significant barriers to formal healthcare access and drive the community's reliance on informal alternatives.

Financial barriers are particularly salient. A substantial portion of Kibera's population lives below the poverty line, earning less than $2 per day [19]. Even minor healthcare costs—such as transport fares or consultation fees—deter formal care-seeking, while drug vendors provide flexible purchasing options (e.g., buying a few pills at a time). These structural conditions make informal antibiotic use a rational response to systemic inadequacies, rather than merely a product of ignorance or irresponsibility [4] [12].

6.1.3. Cues to Action

Both social and environmental factors serve as cues to action that reinforce habit-

ual antibiotic use. Social networks—including neighbours, relatives, and informal healthcare providers—play a critical role in shaping perceptions and decisions. Ocan *et al.* (2019) observed that peer recommendations often substitute for medical consultation [13]. Similarly, the availability of leftover antibiotics in households acts as a visual and behavioural cue to initiate treatment without delay [5].

Environmental cues, such as seasonal disease trends and ongoing sanitation challenges, further catalyse antibiotic use. During dry seasons, dust, concentrated waste, and water scarcity intensify disease outbreaks and drive anticipatory antibiotic use. In Kibera, where communicable diseases are endemic, visible illnesses and poor hygiene conditions reinforce a sense of inevitability and normalise antibiotic use as a preventive measure [6].

6.1.4. Self-Efficacy

The findings underscore a high level of self-efficacy among Kibera residents in managing common illnesses independently. Youth often consult online platforms or mobile apps for symptom analysis and treatment suggestions, while older adults rely on prior experience or community knowledge [5]. Informal drug vendors further empower residents by recommending specific drugs and doses, creating an informal system of self-diagnosis and treatment that many trust more than public health facilities.

While self-efficacy contributes to health autonomy, it also enables inappropriate antibiotic use. This confidence is not grounded in clinical knowledge but in repeated anecdotal success, leading to practices such as underdosing, incomplete courses, and using antibiotics to treat viral infections. This dynamic reflects a broader challenge in behavioural change communication: correcting misuse without disempowering individuals who feel resourceful in navigating complex health systems [14] [16].

6.2. Structural Amplifiers of Risk and Model Limitations

While the HBM effectively frames the cognitive and behavioural aspects of antibiotic misuse, it is limited in its ability to capture macro-level structural influences—such as health system underfunding, pharmaceutical regulation gaps, and urban poverty. These systemic conditions "amplify" HBM constructs: they change how vulnerable and severe something is seen to be, how simple it is to get to information and help, and how reliable and available health information and cues are.

As such, integrating the HBM with socioecological models or social cognitive theory may enhance explanatory power in future analyses [15] [20]. Still, HBM remains a valuable framework for identifying leverage points for behaviour change interventions—especially around improving risk perception, reducing misinformation, and restructuring cues and benefits.

6.3. Implications of the Synthesis

This synthesis underscores that antibiotic misuse in Kibera is not merely an out-

come of individual knowledge gaps but a function of intersecting perceptions, environmental pressures, and structural constraints. The perceived susceptibility to disease is justified by living conditions, while the perceived severity of AMR remains low due to its abstract and long-term nature. Meanwhile, the perceived benefits of self-medication, combined with extreme access barriers to formal healthcare, ensure the persistence of informal antibiotic use.

Behaviour change strategies that only use awareness campaigns probably won't work unless they are paired with actions that fix the problems that make drug abuse possible, like poverty, easy access to drugs, and gaps in the health system. To break this cycle and lower the AMR burden, we need targeted interventions that are in line with the HBM. For example, community education can help people see risks more clearly, regulating illegal drug sales can make people think that the problems are higher, and better access to formal care can make people less reliant on informal systems.

6.4. Integrated Policy Recommendations and Implementation Implications

This section harmonises the policy recommendations with practical implementation insights, linking each intervention directly to findings from the HBM-aligned results and analysis. It also considers political, socioeconomic, and infrastructural realities in Kibera to ensure that recommended strategies are both evidence-informed and context-sensitive.

6.4.1. Strengthen Regulation of Antibiotics and Informal Pharmacies

Findings summary [HBM Constructs: Perceived Benefits, Barriers, and Cues to Action]: Approximately 70% of residents in Kibera obtain antibiotics from informal vendors [12], driven by ease of access, affordability, and social trust [5]. These informal channels bypass prescription requirements and perpetuate antibiotic misuse, especially for viral infections.

Policy and Practice Implications:

- Enforce prescription-only sales through regular pharmacy inspections and licensing of informal sellers.
- Establish an accreditation model (e.g., adapted from Tanzania's Accredited Drug Dispensing Outlets) to integrate trusted informal vendors into a supervised framework.
- Pair regulatory enforcement with community education to minimise backlash and mitigate access challenges.

Implementation Challenges: weak governmental reach, informal economic structures, and possible resistance from vendors necessitate phased enforcement, vendor retraining, and community dialogue to ensure sustainability and acceptance.

6.4.2. Implement Targeted Community Education Campaigns

Findings summary [HBM Constructs: Perceived Severity, Self-Efficacy]: Despite high antibiotic use, 66% - 74% of residents believe antibiotics cure viral infections,

and only a minority understand the risks of AMR [3] [13]. Meanwhile, residents show high self-efficacy in diagnosing and self-treating [5].

Policy and Practice Implications:

- Design locally resonant education programmes using trusted community figures—health volunteers, elders, and youth leaders.
- Deliver messages in local languages via radio, drama, posters, and digital platforms to correct misconceptions and improve antibiotic literacy.
- Emphasise the long-term severity of AMR and promote safer self-care strategies to align with existing self-confidence.

Implementation Challenges: Shifting entrenched norms requires consistent messaging and community-led engagement. Interventions must be iterative, adapting to feedback and evolving perceptions.

6.4.3. Expand Equitable Access to Public Healthcare

Findings summary [HBM Constructs: Perceived barriers]: Kibera's sole government health centre serves over 185,000 people, with only 120 weekly consultations, pushing residents to informal care [2]. Cost, distance, and long waits are key deterrents [19].

Policy and Practice Implications:

- Increase clinic coverage, operating hours, and subsidised service packages (e.g., NHIF expansion).
- Deploy mobile clinics and home-based outreach via community health workers (CHWs) to decentralise access.
- Streamline triage and record-keeping to reduce patient time burdens and improve care continuity.

Implementation Challenges: Budget limitations, urban planning constraints, and limited staffing may slow scale-up. Partnering with NGOs and private-public collaborations could help bridge infrastructure gaps.

6.4.4. Improve Environmental Sanitation and Infrastructure

Findings summary [HBM Constructs: Perceived Susceptibility, Cues to Action]: Over 80% of household *E. coli* isolates in Kibera were multidrug-resistant [6]. Open drains, unsafe water, and pit latrines are persistent sources of infection and visible triggers for antibiotic use.

Policy and Practice Implications:

- Invest in WASH infrastructure—public toilets, drainage, clean water access—through community-driven planning.
- Improve garbage collection and eliminate open defecation hotspots through participatory neighbourhood sanitation schemes.
- Sanitation improvements can reduce perceived and actual exposure, diminishing the reflexive use of antibiotics.

Implementation Challenges: Political neglect of informal settlements, unclear land tenure, and limited government investment require multi-stakeholder partnerships, including UN-Habitat, NGOs, and local authorities.

6.4.5. Establish local AMR Surveillance Systems

Findings summary [HBM Constructs: Perceived Severity, Policy Feedback Loops]: AMR-related mortality in Kenya reached 8500 deaths in 2019, yet local awareness in Kibera remains low [18]. Recent outbreaks, including cholera resistant to 10 antibiotics, highlight the disconnect between microbiological data and community risk perception [17].

Policy and Practice Implications:

- Deploy sentinel AMR surveillance points across clinics, homes, and the environment.
- Integrate surveillance findings into local education and clinic protocols to reinforce relevance.
- Use participatory data sharing to build trust and reinforce public understanding of AMR severity.

Implementation Challenges: Cost and technical complexity can be addressed via KEMRI/CDC platforms, training CHWs in basic data collection, and linking human-environmental health in One Health models.

6.4.6. Localise Global Best Practices through One Health Approaches

Findings summary [HBM Relevance: Systems-Level Model Enhancement]: The HBM emphasises individual cognition, but it is insufficient alone. Structural drivers like poverty, weak regulation, and environmental degradation amplify antibiotic misuse.

Policy and Practice Implications:

- Integrate One Health strategies that connect human, animal, and environmental health.
- Tailor proven interventions—such as India's "Red Line" (packaging markers for prescription-only drugs) and Vietnam's pharmacy training schemes—to Kibera's cultural and economic context.
- Promote intersectoral coordination across health, water, education, and urban planning.

Implementation Challenges: Donor partnerships and national AMR strategic planning can mitigate cross-ministerial collaboration, funding continuity, and political will.

The success of AMR mitigation in Kibera depends not just on individual behaviour change but on Each policy recommendation, when mapped to HBM constructs and grounded in empirical findings, addresses a specific behaviour or environmental driver of antibiotic misuse. We can achieve a sustainable and context-responsive response by combining regulatory enforcement, public education, health system reform, environmental sanitation, AMR monitoring, and multisectoral collaboration.

7. Conclusions

This study presents a comprehensive synthesis of the behavioural, environmental, and structural drivers of antibiotic misuse and antimicrobial resistance (AMR) in

Kibera, one of Africa's largest informal settlements. Using the Health Belief Model (HBM) as an interpretive framework, the study reveals that widespread self-medication is not merely the product of misinformation but a rational, adaptive behaviour shaped by systemic inequalities and environmental stressors.

Key insights show that Kibera residents have a high perceived susceptibility to infectious disease due to overcrowding, poor sanitation, and limited access to clean water. However, there is a substantial underestimation of the severity of AMR, with many residents unaware of the national burden—estimated at 8500 AMR-attributable deaths in Kenya in 2019 [18]. The perceived benefits of self-medication—such as convenience, cost-effectiveness, and trust in informal vendors—clearly outweigh perceived barriers, which include long queues, unaffordable healthcare costs, and under resourced clinics. Social and environmental cues (e.g., leftover drugs, peer influence, visible illness) further normalise Meanwhile, high self-efficacy among residents—driven by digital literacy, informal guidance, and experiential knowledge—encourages confident, though often incorrect, self-treatment practices.

This research contributes to the field by offering a theory-driven, empirically grounded analysis of AMR within a low-income urban context. It bridges the gap between behavioural theory and structural realities, demonstrating that antibiotic misuse is rooted in both perception and circumstance. Moreover, it links behavioural health models with public health policy, providing actionable, evidence-based recommendations for multisectoral AMR containment.

Future research should focus on three key areas:

1) Longitudinal tracking of AMR trends at the community level using localised surveillance systems;

2) Implementation studies evaluating the effectiveness of education, sanitation, and regulatory interventions;

3) Behavioural experiments testing the impact of HBM-aligned communication strategies on antibiotic use behaviours.

Study affirms that reducing AMR in informal settlements like Kibera requires both behavioural change and structural transformation. Policy responses must therefore go beyond awareness-raising to include health system investment, environmental upgrades, and context-specific regulation of informal pharmaceutical markets. Kibera's experience offers critical lessons for addressing AMR across similar urban settlements globally.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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