

Community Perceptions, Compliance, and Institutional Readiness for Biosecurity in High-Density Urban Settlements

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Abstract

High-density urban settlements are considered critical hotspots in terms of biosecurity vulnerabilities due to overcrowding, inadequate sanitation, informal housing structures, and limited institutional penetration. This study examines the interrelationship between community perceptions, compliance, and institutional preparedness in the context of biosecurity governance. This study draws from the experiences of global health outbreaks, especially the COVID-19 pandemic and argues that an effective framework in addressing biosecurity governance involves an integrated approach in terms of risk perception, institutional trust, and structural preparedness. Using a mixed-methods design combining household surveys and key informant interviews, the study proposes an analytical model that evaluates how socio-economic vulnerability, risk communication, and institutional capacity shape compliance outcomes. Findings suggest that while awareness of biosecurity threats is relatively high, compliance remains uneven due to economic precarity, misinformation, and limited institutional readiness. The study contributes to the urban biosecurity discourse in terms of bridging the gap between community-level behavioral analysis and institutional governance capacity. Policy recommendations emphasize decentralized preparedness systems, participatory risk communication strategies, and strengthened urban health infrastructure.

Keywords: Biosecurity, Urban Governance, Risk Perception, Institutional Readiness, Compliance Behavior.

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1. Introduction

Urbanization has profoundly transformed the socio-spatial structure of Nigeria over the past three decades. The rapid urbanization has resulted in a massive expansion of urban areas where major cities have sprawled beyond their original administrative boundaries resulting in the assimilation of peri-urban communities into dense metropolitan clusters characterized by infrastructural strain and socio-economic disparities. This has created a highly dense urban environment characterized by infrastructural challenges and socio-economic disparities. While urbanization has provided a stimulus to urban economies in Nigeria, it has created a host of public health challenges particularly in high-density informal settlements. Within these environments, biosecurity which involves the prevention, detection, and response to biological threats to human, animal, and environmental health has emerged as a pressing governance concern.

Global pandemics such as Severe Acute Respiratory Syndrome (SARS), Ebola Virus Disease, and COVID-19 have shown that densely populated urban settlements are vulnerable to rapid spread of infectious diseases. The Nigerian experience during the Ebola pandemic of 2014 and COVID-19 has shown both resilience and vulnerability of its urban systems. Although, swift national coordination taken during the Ebola pandemic ensured that it was not spread across the country; however, during the COVID-19 pandemic, structural weaknesses in densely populated urban settlements where overcrowding, inadequate sanitation, and informal economic activities are saturated were exposed.

This study adopts a settlement in Ajegunle as a case study. Ajegunle is located within the Ajeromi-Ifelodun Local Government Area in Southwestern Lagos State. It is one of the major settlements in that Local Government Area and lies along the Apapa Port Industrial corridor in the Lagos Metropolitan Area. This community is a typical informal settlement in Nigeria characterized by high population density, compound living arrangements, shared sanitation facilities, limited access to drinking water, and an informal economic system. Ajegunle, like other settlements in Lagos State, has a complex system of governance involving local government agencies, traditional leaders, and community organizations. Such a system of governance makes it an ideal setting for examining how perceptions and preparedness contribute to biosecurity outcomes.

Ajegunle, like other high-density settlements in Lagos State, has structural characteristics that make it difficult to execute traditional biosecurity protocols. The shared water points and sanitation facilities increase susceptibility to infection during an infectious disease outbreak. Overcrowded living arrangements make isolation and social distancing practically impossible. The informal economic system and daily wage labor



also make it difficult for inhabitants to execute stay-at-home orders without an economic consequence. According to de Leeuw (2021), such socio-spatial characteristics are common in urbanizing areas in the Global South and contribute to uneven public health outcomes.

More so, informal economic arrangements, daily wage labour, petty trading, and transportation services, reduce residents' capacity to comply with mobility restrictions without immediate income loss. Biosecurity governance is usually considered at the national or international level through the application of conceptual frameworks proposed by international organizations like the World Health Organization or the Food and Agriculture Organization. However, biosecurity implementation largely depends on the level of compliance at the local level. During the COVID-19 health crisis, the level of compliance with safety measures like the usage of masks, vaccines, and mobility restrictions varied in Nigerian urban communities. Research indicates that the level of biosecurity compliance was largely dependent on socio-economic capacity, public trust, and risk communication (Bargain & Aminjonov, 2020).

Additionally, the high-density communities in Nigeria present an interesting paradox in that the people in these communities often possess experiential knowledge about biosecurity risks because of the recurrent experience of endemic health risks like cholera, malaria, tuberculosis, and so on. However, in the context of economic survival in Nigeria, people in high-density communities often prioritize economic survival over biosecurity risks. In communities like Ajegunle, the majority of the population lives in an environment where economic survival is largely dependent on daily earnings. Consequently, compliance decisions are negotiated between perceived health risks and immediate economic realities.

Community perception, therefore, emerges as a critical factor in biosecurity effectiveness. According to the Risk Perception Theory, human response to biosecurity risks is not necessarily based on objective risk assessment but is influenced by subjective perception, which is shaped by cultural factors, trust, and previous experience (Slovic, 1987; Adeyonu et al., 2021). In Nigeria, historical grievances regarding state responsiveness, uneven service delivery, and political marginalization may influence how citizens in Nigeria perceive biosecurity policies and interventions. Thus, if citizens feel that they are being coerced, they may not adhere to biosecurity policies regardless of the level of objective risk.

In the same vein, Institutional readiness is the third critical factor in effective biosecurity governance. Institutional readiness, as a concept, refers to the presence of adequate infrastructure, personnel, surveillance, emergency response, and coordination to address biosecurity risks. In Nigeria, where urbanization is a major challenge, local



governments face financial challenges, which may limit their ability to develop and implement institutional preparedness strategies to address biosecurity risks. Also, the multi-layered system of governance, where powers are divided between the federal, state, and local governments, may hinder effective response to biosecurity risks (Balogun et al., 2022; Agboola et al., 2024). Meanwhile, despite a large body of literature on biosecurity preparedness, there is a lack of empirical studies that examine the interplay between community perception, compliance, and institutional preparedness within a unified framework in Nigeria's high-density settlements. Most studies examine behavioral compliance in isolation from institutional preparedness and response, and others examine institutional preparedness without adequately incorporating behavioral response and compliance.

This study bridges this knowledge gap through the development and empirical examination of an integrated model of community perceptions, determinants of compliance, and institutional readiness in the Ajegunle Community in Lagos State. This study holds the view that an effective biosecurity governance system in Nigeria's high-density settlements calls for participatory engagement, trust-building, and institutional capacity improvement. This study combines the fields of behavior theory and governance in a way that will enrich interdisciplinary discussions in public health, urban governance, and development studies in addressing Nigeria's biosecurity challenges in a rapidly urbanizing environment.

1- Literature Review

Biosecurity has evolved from a predominantly agricultural and laboratory safety concept to a comprehensive framework encompassing public health, environmental sustainability, and global health security. According to the World Health Organization (2021), biosecurity involves strategic and integrated approaches to analyze and manage risks to human, animal and plant life. In urban context, it relates to urban infrastructure planning, living conditions in human settlements, and environmental security (Traore et al., 2023). It has also been linked to urban planning and design, human settlements, and environmental security.

Research on high-density settlements highlights structural determinants of disease transmission. Overcrowding, poor ventilation, and inadequate sanitation systems facilitate pathogen spread (Adedeji, 2023; Popogbe et al., 2023). In informal human settlements, there are no proper waste management or water supply systems which lead to increasing exposure to waterborne and airborne diseases. This is reflected during the COVID-19 pandemic lockdowns where people living in informal human settlements are affected because they had no social security mechanism (Corburn et al., 2020). Moreover, in the state of public health emergencies, people's compliance levels are



affected by factors such as socio-economic status, level of trust in authorities, and quality of communication. Research has shown that levels of trust in government are a strong determinant of public health compliance levels (Augustine & Enyi, 2020, Shanka & Menebo, 2022, Abayomi, 2024). In contexts where state institutions are perceived as ineffective or corrupt, compliance rates decline. Conversely, community-led initiatives and localized risk communication improve adherence.

Furthermore, the institutional readiness literature has shown that preparedness planning and coordination are important factors in public health emergencies. Balogun et al. (2022) and Agboola et al. (2024) found that adaptive urban governance also matters in urban resilience. In developing urban areas, however, institutional readiness levels are constrained by limited resources and fragmented institutional frameworks. However, while the importance of community engagement and capacity has been highlighted in the literature, very little research has empirically combined these factors in the context of high-density urban environments. This gap underscores the need for holistic frameworks capable of capturing behavioral, structural, and governance dynamics simultaneously.

2- Theoretical Review

This research draws on three complementary theoretical perspectives, Risk Perception Theory, the Health Belief Model (HBM), and Institutional Capacity Theory. The combination of these theories will allow for a comprehensive approach to health behavior and governance in high-density urban settlements. Each theory provides a distinct perspective on different aspects of health behavior and how it can be effectively addressed by institutions.

The Risk Perception Theory was first proposed by Slovic in 1987. The theory argues that individual responses to risk events are primarily influenced by subjective judgments rather than objective data. The theory further argues that individual perceptions of risk can be influenced by culture, trust in authorities, personal experiences, and social contexts. In urban settlements with high populations, health risks such as poor sanitation, water contamination, and disease outbreaks have been chronic in nature. Over time, these risks may become normalized, leading residents to underestimate their severity or likelihood. As a result, in the event of a health risk outbreak, such as the spread of disease, the community may not respond with the necessary preventive action due to the perception of the risk as part of their everyday environment.

Health Belief Model (HBM), was proposed by Rosenstock (1974). The theory offers psychological framework that helps us understand how and why people choose to adopt or avoid health interventions (Anjorin and Wada, 2022; Okafor et al., 2022). The



model is based on a set of cognitive factors that influence health compliance, which include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. In informal settlements, economic insecurity is a major perceived barrier. Despite being aware of their susceptibility and the severity of health risks, people in informal settlements may not be able to act because they are concerned about losing their jobs, lack access to healthcare, and fear eviction from their settlements. These barriers outweigh the perceived benefits, and therefore, people in informal settlements have a low level of compliance with health interventions.

Institutional Capacity Theory, as propounded by Abdullahi (2024), centers around the structural and organizational dimensions of effective governance. It entails the presence of administrative capacity, resource availability, coordination mechanisms, and legitimacy/trust in institutions. In the context of biosecurity management in high-density urban settlements, the role of institutional capacity cannot be overstated. Good governance entails the presence of physical structures and financial support, but also the existence of transparent communication mechanisms and trust in institutions. In the absence of these factors, the effectiveness of institutions in the implementation of health programs will be compromised, especially in situations where the inhabitants of the settlements are skeptical and non-trusting of the institutions.

The combination of the three theories will provide the basis for the formulation of a multidimensional theory, which will reflect the interplay between the perceptions of the inhabitants, individual behaviors, and the role of institutions in the biosecurity management in high-density urban settlements. Risk perception will be the key in influencing the behaviors of the inhabitants, while the role of institutions will be to enhance the behaviors through effective communication and trust. Trust will be the mediating factor between the perceptions of the inhabitants and the authority of the institutions, ensuring effective health outcomes in the urban settlements.

3- Methodology

This study employed a mixed-methods cross-sectional study design with a focus on the case of Ajegunle in metropolitan Lagos, Nigeria. Specifically, the study conceptualized Ajegunle as a high-density informal settlement with compound housing structures, shared sanitation facilities, informal labor markets, and a lack of formal infrastructure in metropolitan Lagos. This setting provides a representative for the study of biosecurity governance dynamics in Nigerian urban settlements.

A multi-stage sampling approach was employed for its data collection. First, Ajegunle was stratified into four residential clusters based on housing density and proximity to market centers. Within each cluster, systematic random sampling was used to select households. A total of 420 adult residents aged 18 years and above were



randomly selected from each cluster using a structured questionnaire with a series of five-point Likert scales for measuring risk perception, trust in institutions, compliance behavior with biosecurity measures, and socio-demographics.

To assess institutional readiness, a qualitative study using 15 in-depth key informant interviews with Lagos State Ministry of Health officials, local authorities, primary healthcare workers, community development association (CDA) leaders, and traditional authorities in the settlement was conducted. An Institutional Readiness Index (IRI) was developed based on a range of indicators, including disease surveillance systems, emergency response protocols, communication infrastructure, resource availability, and inter-agency coordination.

Descriptive statistics and Structural Equation Modeling (SEM) were used for testing hypothesized relationships among variables such as perception of risk, trust, compliance, and institutional readiness for the quantitative data while thematic analysis was used for qualitative data. Ethical clearance was obtained from a Nigerian university's research ethics committee. The study was entirely voluntary, and confidentiality was maintained throughout the study.

4- Results and Discussion

5.1 Socio-Demographic Profile of Respondents

The sample for the survey comprised 400 respondents. The majority of the sample population consisted of economically active adults within the age bracket of 21 to 45 years. The age distribution of 21 to 45 years reflects a demographic concentration of populations residing in high-density urban settlements where young and working-age populations are in the majority. The sample population also reflected a high level of involvement in informal economic activities such as petty trading, transportation services, and daily wage employment, which are characteristic features of urban economic environments where job opportunities are limited. The household composition of the sample population also reflected an average household size of between five and seven persons per household, mostly living in single-room dwellings or shared compound accommodations. These characteristics reflect the problems of overcrowding and inadequate living spaces that are characteristic of urban environments experiencing high rates of population growth. These demographic characteristics are similar to those of urban populations residing in urban centers such as Lagos, Nigeria, and Nairobi, Kenya, where informal economic activities and high-density living are defining features of urbanization and socio-spatial formation (de Leeuw, 2021; UN-Habitat, 2021). In terms of educational attainment, there was a variance in the educational levels attained by the participants. The majority had attained a secondary education. Despite the accessibility of digital information platforms through mobile devices, there was a



variance in digital literacy levels. All these are important contextual elements in understanding the perceptions of the participants, their related behavior in terms of compliance, as well as the levels of trust. This contextual information provides a more nuanced understanding of the survey findings.

5.2 Community Perceptions of Biosecurity Threats

A descriptive study of the Ajegunle Community in Lagos showed a relatively high level of awareness regarding the risks associated with infectious diseases, particularly after the emergence of the COVID-19 pandemic. More than 70% of the respondents acknowledged that they were at risk of disease outbreaks due to the high density of the community. However, it was also found that there were different perceptions regarding the risks. The respondents acknowledged the risk of pandemics; nevertheless, there was a general perception of fatalism. The perception of fatalism emanates from the fact that they have been living with endemic diseases such as cholera, typhoid, and malaria for a long time. This aligns with Risk Perception Theory, as suggested by Slovic (1987), which posits that familiarity with hazards can diminish feelings of fear or urgency because the risks are perceived as routine. Similarly, there was also misinformation regarding the risk of disease outbreaks. The misinformation emanated from social media and word of mouth. Although official channels from health authorities disseminated preventive guidelines, such as handwashing and social distancing, contradictory messages circulated informally through social media and word-of-mouth. Also, trust in public health authorities played a crucial role; respondents with greater confidence in Lagos municipal health officials showed stronger adherence to scientifically recommended practices. These findings underscore that awareness alone does not guarantee behavioral change; instead, perceptions are shaped by complex socio-cultural and informational ecosystems that must be addressed holistically.

5.3 Determinants of Compliance Behaviour

In the Ajegunle community in Lagos, the level of compliance with the recommended biosecurity protocols such as the use of masks, vaccination, hygiene, and movement restrictions varied in the population. Using the Structural Equation Modeling (SEM) approach, the analysis revealed that individuals who perceived themselves to be susceptible to the illness and the severity of the health threat were more likely to comply with the safety protocols ($\beta = 0.42$, $p < 0.01$). This resonates with the health belief model, which suggests that perceptions influence health behaviors. However, the perceived barriers such as income loss and the inconvenience of living in congested spaces also impacted the level of compliance ($\beta = -0.38$, $p < 0.05$). Many people in the

Ajegunle community perceived the lockdown to be a threat to their daily survival, especially the working class who depend on their income on a day-to-day basis.

The level of trust in the health authorities in the Ajegunle community also played a crucial role in the level of compliance. Participants who trusted the local health authorities in the community felt more inclined to follow health protocols. This is supported by earlier findings that showed a positive correlation between health protocols and institutional trust (Augustine & Enyi, 2020; Shanka & Menebo, 2022; Abayomi, 2024). Conversely, mistrust arising from marginalization and neglect by the government contributed to low levels of health compliance. In addition, gender and education levels played a part in health compliance. For instance, women showed higher levels of health hygiene, which could have been a result of the roles they played in society. In addition, people with higher education levels showed higher levels of health compliance and this could have been a result of higher health literacy levels. In conclusion, the health behavior exhibited in the Ajegunle community is a complex interrelation between perceptions, socio-economic conditions, and institutional trust in health authorities. This makes health behavior a complex phenomenon in a densely populated community like Ajegunle in Lagos state.

5.4 Institutional Readiness Assessment

Using the Institutional Readiness Index (IRI) assessment tool, the health status in Ajegunle Community in Lagos state was found to have moderate levels of readiness. Despite the moderate levels of readiness in the community, there are several shortcomings in the structure of the health system. First, the community has an effective communication system in place. This ensures a certain level of information exchange between the health agencies at the national level. Additionally, basic surveillance systems are in place, allowing for initial detection of health threats. However, weaknesses are evident in critical areas such as emergency response logistics, where the lack of well-organized transportation and supply chains hampers rapid deployment of resources. Consequently, resource allocation remains inadequate, often constrained by limited funding and logistical bottlenecks, which further complicates timely intervention efforts. Inter-agency coordination is also weak, with fragmented efforts reducing overall effectiveness during health crises.

Furthermore, the key informant interviews with local health officials and community leaders revealed the lack of fiscal autonomy for local governments, which limits their ability to rapidly mobilize containment resources such as test kits, PPE, and quarantine facilities. Overcrowding in housing and the nature of the informal settlement in Ajegunle also make contact tracing and quarantine efforts difficult because people live in a closely populated settlement with little space for quarantine. There are also



infrastructural challenges such as a lack of reliable electricity and communication systems, which limit the ability to communicate with people in a linguistically diverse settlement.

Using Grindle's (1996) Institutional Capacity Theory, it is evident that despite the existence of some administrative structures, resource availability and governance structures limit their ability to respond to outbreaks due to their fragmented nature (Akpan et al., 2022, Abdullahi, 2024, Nijhum, 2025). Moreover, people are not complying with government initiatives because of their mistrust of the government, which further reduces the effectiveness of institutional responses to outbreaks. However, cities like Mumbai have shown that partnerships with local leaders and a bottom-up approach can significantly improve the effectiveness of responses to outbreaks and increase trust in the ability of institutions to respond to outbreaks (Corburn et al., 2020). Although these models are not entirely institutionalized in Ajegunle, their integration could improve the effectiveness of responses to outbreaks in the future.

5.5 Integrated Model Testing

The findings from the research conducted in the Ajegunle Community in Lagos state clearly demonstrate the significance of a comprehensive approach to biosecurity governance. The integrated analytical model has produced excellent goodness-of-fit statistics: CFI = 0.93; RMSEA = 0.05. This clearly suggests that the hypothesized relationships between perception, trust, compliance, and institutional readiness are well supported in this particular context. More specifically, it has been determined that institutional readiness has a positive moderating influence on the relationship between perception and compliance. In other words, if institutional structures in the Ajegunle Community demonstrate strong governance structures in place, then it is more likely that the people in this particular community will demonstrate tangible levels of behavioral compliance. In this respect, it is quite evident that effective governance plays a critical role in reinforcing community-based compliance with biosecurity protocols, especially in health crises or disease outbreaks.

Trust has been revealed as a mediator and amplifier in this particular relationship. In the context of the Ajegunle Community, where there is clear communication and transparency in preparedness, levels of compliance tend to increase. To exemplify this, it was noted that the community tends to comply with health regulations if they believe it is in their best interest and if they have the capacity to enforce it. On the other hand, low levels of preparedness tend to have a negative impact on the level of influence of accurate risk perception. Therefore, it is crucial to develop credible and resourceful institutions that can foster trust and compliance.



The above findings have provided clear evidence of the requirement for a behavioral approach combined with strengthening institutional capacity in order for effective biosecurity practices to be achieved in Ajegunle. The awareness of the community needs to be addressed by credible and resourceful institutions in order to sustain compliance, particularly in a densely populated area where vulnerability is high. Such an integrated approach is essential for achieving long-term health security and resilience at the community level.

5.6 Discussion

From the findings emanating from the study conducted in the Ajegunle community in Lagos state, Nigeria, there are three critical insights that provide a deeper understanding of the concept of biosecurity. This is especially important in light of emerging health issues in densely populated urban settlements. This is in view of the socio-economic environment in which the people of Lagos, Nigeria, live. The first insight from the findings emanating from the study is that there is a relatively higher level of awareness regarding the risks emanating from biosecurity issues in densely populated urban settlements. This is despite the fact that the translation of this awareness into actual behavior is often constrained by issues of structural inequalities. This awareness stems from various sources, including local health campaigns, community leaders, and informal social networks that disseminate information about hygiene, sanitation, and disease prevention.

However, despite this relatively high level of knowledge, behavioral compliance with recommended biosecurity practices, such as washing hands regularly, disposing of waste appropriately, and using protective equipment, remains poor. This can be explained by the significant socio-economic disparities that define Ajegunle. The majority of people live in overcrowded homes and lack access to clean water, sanitation, and healthcare. These socio-economic factors limit people's ability to act on the information they have because they cannot afford materials, e.g., soap, disinfectants, and protective equipment.

Additionally, there is a lack of access to and usage of formal institutions, poor infrastructure, and planning, which all contribute to the poor ability of people in Ajegunle to act on the information they have. For example, even if people are aware of the importance of waste disposal, they may not be able to access waste disposal services. This is because, in Ajegunle, people live in overcrowded homes, which makes it difficult to practice social distancing and isolation. This shows that, despite awareness, behavioral change is not enough; it is important to address the socio-economic and infrastructural challenges that define Ajegunle.



Secondly, the role of institutional trust in biosecurity compliance cannot be overlooked, especially in terms of the importance of legitimacy and participatory governance. In Ajegunle, there is an intricate relationship between the willingness of residents to comply with public health directives and the legitimacy of the government. Therefore, in this context, the residents' willingness to comply with public health directives in Ajegunle is directly related to the level of legitimacy that they attribute to the government. For example, in Ajegunle, residents are more willing to comply with public health directives when they believe that the government is transparent and genuinely concerned about the welfare of the residents. However, in cases where the government is not transparent in its operations and is only concerned about enforcing public health directives, residents become skeptical about the information given to them about public health concerns.

Third, institutional readiness goes beyond physical and technical preparedness; it is, in essence, a relational construct that is contingent upon sustained community engagement. Thus, in Ajegunle, it is not just a matter of whether institutions are physically and technically prepared, e.g., whether they have clinics, water, and waste disposal facilities, but whether they can establish a relationship of trust and cooperation with the people. To be effective, biosecurity interventions must be able to engage institutions that are flexible, culturally aware, and committed to dialogue and continuous engagement with the people. For instance, it is not enough to establish handwashing stations and waste disposal facilities; they must be able to establish a relationship with the people that enable them to use these facilities and feel a sense of ownership and belonging. This relational aspect is vital because it influences whether residents perceive institutions as partners rather than external authorities imposing rules from above.

Moreover, engaging the community enables the co-creation of solutions. In Ajegunle, engaging the people in the design of a program in sanitation or health education will ensure that it is appropriate. Similarly, when people are well engaged, it will help in the identification of issues that could act as barriers in the implementation of a program.

5.7 Implications for Urban Governance Scholarship and Biosecurity Discourse

The findings of this research have significant implications for the urban governance scholarship and the wider discourse on biosecurity. First, they empirically validate several theoretical frameworks. The integration of Risk Perception Theory, the Health Belief Model, and Institutional Capacity Theory provides a comprehensive and cohesive approach to the study of biosecurity. The integrated approach helps in the understanding of the complex issue of biosecurity. It also expands the scope of the discourse on biosecurity beyond the biomedical model. The biomedical model is limited



to the control of pathogens and medical interventions. The integrated approach provides a wider scope for the discourse by incorporating socio-economic factors. In the urban informal settlement of Ajegunle, where infrastructure and socio-economic inequalities are significant concerns, it is essential to consider a holistic approach to the issue of biosecurity.

In conclusion, the insights derived from Ajegunle underscore that managing biosecurity risks in urban informal settlements requires more than disseminating information about hazards. It demands concerted efforts to address structural inequalities, build institutional trust through participatory governance, and foster relational capacity within institutions. Recognizing the complex interplay between socio-economic factors, perceptions, and governance structures is crucial for designing sustainable and effective biosecurity interventions. The study has provided significant insights into the issue of biosecurity in urban informal settlements. It is essential for policymakers and urban planners seeking to improve health outcomes in similar contexts in Lagos, Nigeria and beyond.

5- Policy Implications

The findings from this study reinforce the need to ensure that biosecurity in high-density urban settlements is not just a reactive measure to disease outbreaks but a systemically embedded concept. First, there is a need to ensure decentralization in the governance of biosecurity. For instance, in urbanizing cities such as Lagos and Nairobi, city authorities may not have the requisite fiscal space to respond effectively to emerging biological risks. Decentralization in the governance of biosecurity in urban areas will ensure an institutional framework to respond to disease outbreaks. This will ensure an effective institutional framework in place in urban areas.

Second, the participatory governance structures must be institutionalized. This is evidenced in the study, which indicates that trust acts as a mediator in the relationship between compliance and governance. Risk communication strategies must, therefore, incorporate local leaders, religious groups, market organizations, and youth groups. Such partnerships with local actors will increase the legitimacy and reduce the spread of false information in informal settlements. During the COVID-19 pandemic, cities that institutionalized these structures in public health task forces experienced greater adherence to public health measures than those that did not (Corburn et al., 2020).

Third, socio-economic support structures are essential in the long run for sustaining compliance with biosecurity measures. Economic insecurity was a leading barrier to adherence in the study. Policies that incorporate economic support measures, such as emergency cash transfers, food systems, and informal economy worker support systems,



in biosecurity frameworks will reduce the economic trade-offs that undermine public health behaviors. Biosecurity frameworks must, therefore, be aligned with broader socio-economic support strategies to avoid exacerbating inequality in the long run.

Fourth, infrastructural support is essential in addressing the underlying vulnerabilities in informal settlements. Overcrowding, poor sanitation, and housing are leading causes of biological hazards in informal settlements. Reforms in urban planning strategies will reduce these hazards through infrastructure development in housing, water systems, waste management, and ventilation systems in informal settlements. Such strategies are in line with the integrated urban resilience strategies proposed in the World Health Organization and United Nations Human Settlements Programme frameworks for urban resilience.

Lastly, institutional transparency must be enhanced in urban governance structures for greater biosecurity in informal settlements. Access to reliable and timely public health information will increase trust in public health authorities and reduce the spread of false information in informal settlements. Such structures will increase public confidence in public health authorities and instill a sense of shared responsibility in urban residents. In conclusion, a multidimensional biosecurity policy in informal settlements must address the interrelated aspects of decentralized governance structures, participatory structures, socio-economic support structures, infrastructural support, and institutional transparency for greater biosecurity in informal settlements in Africa.

6- Conclusion

The research was designed to explore the interrelationship between community perceptions, compliance behaviors, and institutional preparedness in biosecurity in high-density urban settlements. The research findings suggest that biosecurity governance is neither solely biomedical nor administrative in character but rather socio-institutional in character.

Firstly, the research findings confirm that biosecurity risk awareness is relatively widespread in densely populated urban settlements. However, there was no direct link between risk awareness and biosecurity compliance behaviors. Perception is mediated through socio-economic factors, information systems, and historical experiences of marginalization.

Secondly, the research found that biosecurity compliance behaviors were mediated through institutional trust. In this regard, biosecurity institutions that are trusted to be transparent, competent, and community-centered can enhance biosecurity compliance behaviors in densely populated urban settlements. In contrast, the absence of trust can undermine biosecurity compliance behaviors despite high levels of risk



perception. The research also found that legitimacy is an integral dimension of biosecurity governance.

Third, the research suggests that the level of institutional readiness also plays a role in behavioral outcomes. It must be understood that this readiness extends beyond the level of policy to include the level of operational capacity. In the case of Mumbai and Lagos, which are both rapidly urbanizing cities, the level of biosecurity will be determined by the ability to bring together technical knowledge and local knowledge in the form of participatory governance structures.

The research makes a theoretical contribution to the literature in the sense that it brings together the Risk Perception Theory, the Health Belief Model, and the Institutional Capacity Theory in a unified model. It also makes a practical contribution to the literature in the sense that it demonstrates the role of the interaction between perception, trust, and readiness in structurally constrained environments. It also makes a methodological contribution in the sense that it uses a combination of quantitative and qualitative research methods.

However, the research has several limitations. It must be understood that the research relies on a cross-sectional approach, which limits the ability to draw causality. Future research must be done using longitudinal research to understand the role of trust in the structurally constrained environments. It must also be understood that the research must be done in multiple cities to refine the model.

In conclusion, to strengthen biosecurity in structurally constrained urban environments, it must be understood that new forms of governance must be created. Sustainable preparedness depends not only on institutional infrastructure but also on cultivating reciprocal trust between authorities and communities. By aligning behavioral insight with institutional reform, urban centers can enhance resilience against future biological threats while promoting social equity and inclusive governance.



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