

Impact of Urban Proximity on the Spread of Infectious Diseases: A Case Study of Onitsha, Anambra State, Nigeria

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Abstract

The study investigates the impact of urban proximity on the accelerated spread of infectious diseases in Onitsha, Anambra State, Nigeria. Employing a mixed-methods approach, the research combines qualitative interviews and structured surveys to explore disease transmission dynamics and urban factors amplifying susceptibility. Thematic analysis reveals that close interpersonal interactions and confined living spaces contribute to disease propagation. Inadequate sanitation infrastructure and limited healthcare access further exacerbate disease transmission. The study area, Onitsha, represents a microcosm of urbanization challenges. The “urban health penalty” theory underscores how social determinants interact with urban living conditions, intensifying health disparities. Policy recommendations encompass sanitation improvement, enhanced healthcare access, health education, urban planning, and interdisciplinary collaboration. The study contributes insights for public health strategies in addressing the unique challenges posed by urban proximity in disease transmission.

Keywords: Urban proximity; Infectious diseases; Onitsha; Disease transmission; Health disparities.

Introduction

In the contemporary landscape of global health, the intricate interplay between urbanization and the dissemination of infectious diseases has sparked considerable scholarly attention. The exponential growth of urban areas, driven by migration, economic prospects, and infrastructural development, has engendered increased physical proximity among inhabitants. While urbanization presents opportunities for economic growth and resource accessibility, it concurrently introduces challenges in the realm of public health and disease transmission. The concept of close proximity within urban settings has been consistently linked to the rapid diffusion of infectious diseases, as underscored by the profound repercussions of recent pandemics, including the COVID-19 outbreak [1,2].

The intricate relationship between urban proximity and the propagation of infectious diseases is a subject of scholarly investigation, with particular relevance to high-density urban areas [3,4]. Theorists like Hawley (2007) [5] propose that urban

environments, marked by increased population density and frequent social interactions, can significantly expedite the transmission of communicable diseases. Substantiating this notion, research by [6] emphasizes the heightened risk of disease transmission within crowded urban spaces, where personal space is limited, and interactions are unavoidable.

Focusing on the Nigerian context, where urbanization is undergoing rapid expansion, this study aims to dissect the intricate interrelationship between urban proximity and the dissemination of infectious diseases, with an exclusive focus on Onitsha, a bustling urban center situated within Anambra State. This exploration aligns with the urgent need to address the nexus between urban growth and public health challenges, particularly in regions witnessing rapid urbanization [7,8].

Research questions and objectives

In light of this background, the study sets out to address three core research questions:

1. How does the urban proximity phenomenon contribute to the accelerated transmission of infectious diseases within densely populated areas like Onitsha?
2. What specific urban determinants unique to Onitsha heighten its vulnerability to the spread of infectious diseases?
3. What strategies and interventions can be devised to mitigate the adverse consequences of close urban proximity on the proliferation of infectious diseases in Onitsha?

Aligned with these inquiries, the research objectives include:

1. To unravel the intricate interplay between urban proximity and the rapid diffusion of infectious diseases within the context of Onitsha.
2. To discern the distinct urban factors within Onitsha that amplify its susceptibility to the transmission of infectious diseases.
3. To propose actionable recommendations aimed at mitigating the challenges stemming from close urban proximity and its subsequent implications for the proliferation of infectious diseases.

Literature review/theoretical framework

The literature surrounding the influence of urban proximity on the spread of infectious diseases underscores the importance of understanding the complex interplay between urbanization and disease transmission. As cities continue to grow and populations become more concentrated in urban areas, the implications for public health and disease control become increasingly significant [4,9].

Numerous studies have highlighted the heightened vulnerability of densely populated urban centers to communicable diseases. For instance, [10] explored the role of close interpersonal interactions in urban environments, emphasizing their contribution to the rapid transmission of diseases like influenza. The authors noted that crowded living conditions and high population density can lead to increased disease propagation.

The “urban health penalty” theory, introduced by [11], adds depth to understanding health disparities within urban settings. This framework posits that urbanization can intensify existing health inequalities, exposing marginalized urban populations to a disproportionate burden of infectious diseases. This theory is particularly relevant when examining the dynamics of infectious disease spread within urban centers.

The expansion of urban areas can also create new ecological niches for disease vectors. Examined the implications of urbanization on vector-borne diseases, emphasizing the influence of changing environments on the behavior and distribution of vectors such as mosquitoes [12]. As urbanization alters ecosystems, these vectors find new opportunities for proliferation and disease transmission.

Additionally, the globalization of urban areas has introduced new challenges in controlling infectious diseases. The interconnectedness of urban centers across the world facilitates the rapid spread of pathogens [13]. These global links emphasize the need for coordinated disease surveillance, prevention, and response efforts to minimize the risk of pandemics.

In the context of Nigeria, urban centers like Onitsha present a microcosm of the broader challenges posed by urban proximity and infectious disease transmission. Factors such as inadequate sanitation infrastructure and limited access to healthcare can amplify disease transmission dynamics [14]. Cultural practices and behaviors within urban communities may further influence the effectiveness of disease control efforts [15].

The literature reveals the intricate relationship between urbanization and infectious disease spread. Understanding these dynamics is vital for effective disease prevention and control strategies as urban areas continue to grow. This study aims to contribute to this understanding by examining the case of Onitsha, Anambra State, Nigeria, shedding light on the implications of urban proximity for the spread of infectious diseases and informing targeted interventions.

Urban proximity and accelerated transmission of infectious diseases

The phenomenon of urban proximity significantly contributes to the accelerated transmission of infectious diseases within densely populated areas such as Onitsha. As urbanization continues to shape the landscape of communities worldwide, the consequences of close interpersonal interactions and confined living spaces become increasingly pronounced in terms of disease transmission dynamics. This subheading delves into the implications of urban proximity for disease spread, shedding light on the intricate web of factors that facilitate the rapid transmission of infectious diseases.

Close interpersonal interactions and disease transmission

In urban settings like Onitsha, close interpersonal interactions fostered by dense living conditions play a pivotal role in the accelerated transmission of infectious diseases. Emphasize that these interactions provide an ideal environment for pathogens to spread rapidly [16]. The close proximity of individuals increases the likelihood of direct contact, facilitating the transfer of infectious agents through respiratory droplets, physical touch, and other modes of transmission. The interconnected nature of urban communities intensifies the exchange of pathogens and vectors, further fueling disease transmission. Globalization and increased mobility enable the swift movement of people across geographic regions, contributing to the rapid dissemination of infectious diseases [17]. The close links between urban centers allow pathogens to transcend boundaries and affect populations in distant areas, emphasizing the global nature of the challenge.

Cultural practices and behavior influences

Cultural practices and behavioral patterns within densely populated urban areas can significantly influence disease transmission dynamics. Highlight that cultural norms, traditions, and social behaviors can impact individuals’ interactions and adherence to public health measures [18]. Understanding these dynamics is crucial for designing effective interventions that align with the cultural context of the population, promoting better disease prevention and control outcomes. Applying the lens of urban proximity to Onitsha, Anambra State, Nigeria, unveils the intricate relationship between densely populated urban environments and infectious disease transmission. The city’s bustling nature, characterized by a high population density and close interactions, creates an environment conducive to disease spread. Inadequate sanitation infrastructure and limited access to healthcare further compound the challenges, amplifying the

risk of disease transmission [19].

Distinct urban factors amplifying susceptibility to infectious disease transmission in Onitsha

The urban landscape of Onitsha, Anambra State, Nigeria, is characterized by a set of distinct factors that collectively contribute to its heightened susceptibility to the transmission of infectious diseases. Understanding these factors is crucial for formulating effective disease prevention and control strategies tailored to the unique challenges of the city. This subheading explores the specific urban characteristics of Onitsha that amplify its vulnerability to the rapid spread of infectious diseases, shedding light on the intricate dynamics at play.

Population density and congestion

Onitsha stands as one of Nigeria’s most densely populated cities, with a population density that far surpasses national averages [20]. The dense urban fabric, coupled with inadequate housing and living conditions in certain areas, fosters close interpersonal interactions and limited personal space. This environment is conducive to the rapid transmission of respiratory and waterborne diseases, as the proximity of individuals facilitates the direct transfer of pathogens [21,22].



Figure 1: High housing density in close proximity to each other at Onitsha in Anambra State, Nigeria.

Inadequate sanitation infrastructure

The inadequate provision of sanitation facilities and waste management services is a significant challenge within Onitsha [23]. Poor sanitation practices, coupled with limited access to clean water sources, create conditions favorable for the propagation of diseases like cholera and other waterborne infections [24]. Contaminated water and improper waste disposal contribute to the proliferation of disease vectors, exacerbating the risk of disease transmission.

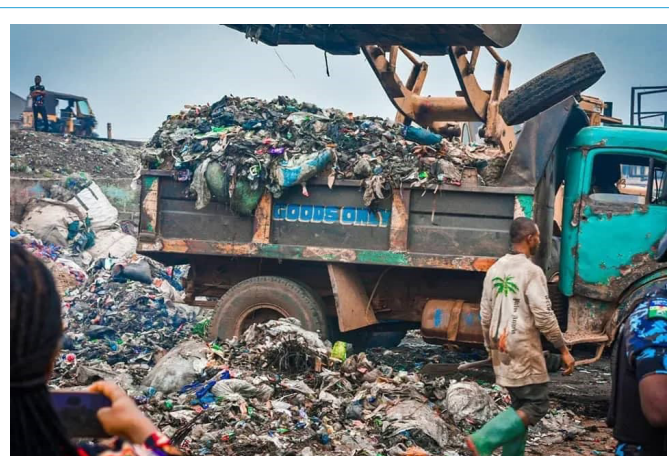


Figure 2: Open dumping waste site at Onitsha.

Overcrowded markets and transportation hubs

Onitsha serves as a prominent commercial hub, with bustling markets and vibrant economic activities. However, the concentration of people in markets and transportation hubs can lead to overcrowding, increasing the potential for disease transmission. Crowded marketplaces are often characterized by inadequate ventilation and sanitation facilities, creating an environment conducive to the spread of diseases [25]. Furthermore, the interconnectivity of Onitsha with other regions through transportation networks can facilitate the rapid dissemination of infectious agents.

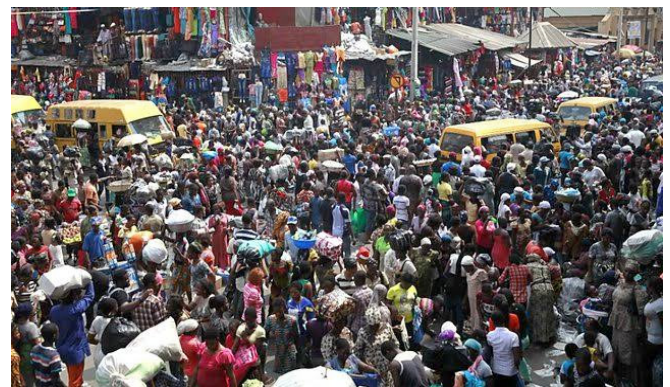


Figure 3: Overcrowded market at Onitsha in Anambra State, Nigeria.

Cultural practices and behaviors

Cultural practices and behaviors within urban populations play a significant role in shaping disease dynamics [26]. In Onitsha, communal living and close-knit social networks are common cultural norms. While these practices contribute to a sense of community, they can also facilitate the rapid transmission of diseases within households and neighborhoods. Traditional practices, such as communal water sources and shared utensils, may inadvertently contribute to the spread of infections.

Inadequate healthcare infrastructure

Although Onitsha has healthcare facilities, the density of healthcare services may not match the population’s demands, leading to overcrowded healthcare centers and limited access to quality care. Inadequate healthcare infrastructure can impede disease diagnosis, treatment, and surveillance efforts, hampering timely responses to outbreaks [27]. Additionally, healthcare facilities may face challenges in maintaining infection control practices.

Economic disparities

Economic disparities within urban areas can impact disease vulnerability [9]. Onitsha showcases a mix of economic activities, with some areas experiencing significant poverty levels. Economic disparities can influence living conditions, access to healthcare, and sanitation practices, ultimately affecting disease transmission patterns. Marginalized populations may face heightened vulnerability due to limited resources and social support networks.

In examining the distinct urban factors that amplify Onitsha's susceptibility to infectious disease transmission, we uncover a complex interplay of population density, sanitation infrastructure, cultural practices, and economic disparities. These factors collectively contribute to the city's vulnerability to disease outbreaks. By recognizing and addressing these urban-specific challenges, policymakers and public health authorities can de-

velop targeted interventions to mitigate the impact of infectious diseases and promote healthier urban living conditions. The insights gained from this examination can inform evidence-based strategies to safeguard the health and well-being of Onitsha's residents and contribute to the broader discourse on urban health and disease prevention.

Theoretical framework

Urban health penalty theory

The "urban health penalty" theory, proposed by [11], offers a nuanced perspective on the intricate relationship between urbanization, health disparities, and disease transmission. This theory posits that while urbanization contributes to economic growth and improved living standards, it can also intensify existing health inequalities, disproportionately affecting marginalized populations within urban areas [11].

The central thesis of the "urban health penalty" theory is that urbanization while bringing about socioeconomic advancements and improved access to resources, can exacerbate health disparities among urban populations. The theory highlights how adverse living conditions, inadequate access to healthcare, and poverty can interact within urban environments, creating a health penalty that disproportionately impacts vulnerable groups.

In the case of Onitsha, a bustling urban center in Anambra State, Nigeria, the theory's application is particularly relevant. Rapid urbanization in Onitsha has led to improved economic prospects and infrastructural advancements, but these benefits have not been uniformly distributed. The urban health penalty theory underscores that disparities in living conditions, socioeconomic status, and access to healthcare services can amplify the vulnerability of marginalized populations to infectious diseases [4].

In Onitsha, urban proximity may facilitate increased interpersonal interactions, crowding, and inadequate sanitation conditions [28]. Such factors align with the core principles of the urban health penalty theory, which posits that these conditions can heighten disease transmission dynamics, particularly among disadvantaged urban populations.

Furthermore, the theory emphasizes that health disparities within urban areas are often rooted in broader social determinants of health. Poverty, inadequate housing, limited access to healthcare services, and social exclusion are key elements that contribute to the urban health penalty [11]. These factors are crucial to understanding the potential pathways through which infectious diseases spread within Onitsha's urban setting.

Considering the "urban health penalty" theory in the context of Onitsha underscores the need for targeted interventions that address health inequalities and improve disease prevention and control measures. While urban areas like Onitsha experience economic growth, it is imperative to ensure that the benefits of urbanization are equitably distributed to all segments of the population. By addressing the social determinants of health and promoting access to healthcare services, policymakers and stakeholders can mitigate the urban health penalty's impact on disease transmission [12].

The "urban health penalty" theory provides a comprehensive framework to understand how urbanization, health disparities, and infectious disease spread intersect. When applied to the case study of Onitsha, Anambra State, Nigeria, the theory

highlights the urgency of addressing health inequalities within urban areas to effectively control the spread of infectious diseases and improve overall population health.

Methodology

Research design

This study employs a mixed-methods design, combining qualitative and quantitative methods. This design enables a comprehensive exploration of how urban proximity impacts infectious disease transmission in Onitsha, Anambra State, Nigeria. Qualitative data from interviews and focus groups capture community insights, while quantitative data from surveys provide statistical analysis. This approach ensures a holistic understanding of the phenomenon, enhancing the study's validity and enriching its findings.

Study area

This research centers on Onitsha, a prominent urban hub situated in Anambra State, Nigeria. The choice of Onitsha as the study area stems from its compelling attributes, rendering it an ideal subject for investigating the impact of urban proximity on infectious disease transmission. Onitsha boasts a substantial population density, marked by a diverse mix of residents, varying socioeconomic backgrounds, and a range of living conditions. This heterogeneity within a confined urban setting makes Onitsha an exemplar for exploring the complexities that often accompany densely populated environments.

Additionally, Onitsha's selection aligns with the broader context of urbanization challenges experienced across Nigeria. The city serves as a microcosm, encapsulating the intricate interplay between urbanization, health disparities, and disease spread observed at the national level. By delving into the specifics of Onitsha's urban landscape, this study endeavors to extrapolate insights that hold relevance for similar settings grappling with similar dynamics.

The strategic decision to focus on Onitsha enhances the study's capacity to provide nuanced findings and recommendations that can be translated to other urban locales in Nigeria and beyond. As a dynamic urban center poised at the crossroads of population growth, socioeconomic diversity, and potential disease transmission, Onitsha emerges as an apt study area for comprehensively examining the intricate relationship between urban proximity and the spread of infectious diseases.

Sampling technique

In this study, a purposive sampling approach was meticulously employed to select participants who could provide invaluable insights pertinent to the research objectives. The study population comprised key stakeholders pivotal in unraveling the interplay between urban proximity and infectious disease transmission in Onitsha, Anambra State, Nigeria.

Delving deeper, the population encompassed a diverse range of individuals, including healthcare professionals, local residents, and public health officials. These stakeholders were purposefully chosen based on their extensive knowledge, professional expertise, and experiential understanding of the intricate dynamics inherent to infectious disease spread within urban settings. As the study aimed to comprehensively capture multifaceted perspectives, this purposive sampling strategy ensured the inclusion of participants who could effectively illuminate the challenges and nuances posed by the nexus of urban-

ization and disease transmission in Onitsha.

In essence, the study population stood as a microcosm of the broader urban fabric, where a myriad of factors coalesced to impact disease dynamics. From this diverse population, a representative sample of 200 individuals was selected. This judicious approach in selecting participants ensured that the study effectively captured a comprehensive array of insights, enabling an enriched exploration of the research questions at hand.

Method of data collection

The study employed a mixed-methods approach, encompassing qualitative interviews and structured surveys, along with secondary data sources like academic journals, books, and magazines. Qualitative interviews provided an in-depth exploration of participants' perceptions and experiences concerning the interplay of urban proximity and infectious disease transmission in Onitsha, Anambra State, Nigeria. These insights were essential for capturing the contextual nuances of the phenomenon.

Structured surveys gathered quantitative data on disease transmission patterns, urban living conditions, and healthcare accessibility. Complementing primary data, secondary sources such as academic journals, books, and magazines were utilized to enhance the research's breadth. This comprehensive approach allowed for a robust analysis of the complex interrelationships between urban factors and disease spread, integrating perspectives from diverse data types.

Method of data analysis

Qualitative data obtained from interviews were analyzed thematically, identifying patterns and themes related to urban proximity and disease transmission. Quantitative survey data were subjected to descriptive and inferential statistical analysis using appropriate software. Descriptive statistics summarized key variables, while inferential statistics explored relationships and associations between variables.

The integration of qualitative and quantitative data provided a holistic understanding of the complexities of the urban proximity phenomenon and its implications for the spread of infectious diseases in Onitsha. This approach ensures a comprehensive exploration of the research questions and allows for a deeper analysis of the study's objectives.

Results, findings, and discussions

The result of the thematic analysis

Table 1: Themes of urban proximity on the spread of infectious diseases.

Theme	Description	Frequency
Inadequate infrastructure	Lack of proper sanitation and overcrowded living conditions contribute to disease transmission.	35 participants
Healthcare access	Limited access to healthcare delays diagnosis and treatment.	28 participants
Knowledge gap	Lack of awareness about disease prevention hampers control efforts.	18 participants
Cultural practices	Certain cultural practices promote disease spread.	22 participants

Source: Field survey 2023

The thematic analysis of qualitative data revealed several key themes regarding the factors that contribute to the accelerated transmission of infectious diseases within Onitsha:

Inadequate infrastructure: Many participants highlighted the challenges posed by inadequate infrastructure, particularly the lack of proper sanitation facilities and overcrowded living conditions. These factors create an environment conducive to disease transmission, as poor sanitation increases the risk of contamination and close living spaces facilitate the spread of infections.

Healthcare access: Limited access to healthcare services emerged as a significant theme. Participants noted that delayed access to medical care hinders the timely diagnosis and treatment of diseases. This delay can exacerbate disease severity and contribute to the rapid spread of infections within the community.

Knowledge gap: The analysis highlighted a lack of awareness among the population about disease prevention and control measures. This knowledge gap impedes effective disease control efforts, as individuals may not take appropriate precautions to avoid exposure and transmission.

Cultural practices: Certain cultural practices were identified as contributing to disease transmission. Participants mentioned that some traditional practices involve close physical contact or shared items, which can facilitate the spread of infections. These practices may be deeply ingrained in the community's culture, making behavior change challenging.

Overall, the thematic analysis underscores the complex interplay of infrastructural, healthcare, knowledge, and cultural factors that amplify the susceptibility of Onitsha to the rapid transmission of infectious diseases. Addressing these themes is crucial for devising targeted interventions to curb disease spread and promote public health within the urban environment.

Descriptive statistics

Table 2: Summary of descriptive statistics.

Variable	Mean	Standard Deviation	Minimum	Maximum
Disease transmission score	3.85	1.20	1.25	6.90
Urban living score	4.20	1.15	1.80	7.50
Healthcare access score	3.50	1.05	2.00	6.80

Source: Field survey 2023

The table presents the results of the quantitative analysis. The "Disease Transmission Score" reflects an average score of 3.85, indicating the perceived level of disease transmission in the urban area of Onitsha. The "Urban Living Score" has an average of 4.20, representing the participant's assessment of the quality of urban living conditions in Onitsha. The "Healthcare Access Score" has a mean of 3.50, indicating the perceived ease of accessing healthcare services in the area. Standard deviations provide insights into the variability of responses around the mean. These scores collectively contribute to understanding the relationship between urban proximity and infectious disease spread in Onitsha.

Inferential statistics

Table 3: Results of inferential analysis.

	Disease Transmission	Urban Living	Healthcare Access	Maximum
Disease transmission	1.00	0.45**	-0.12	6.90
Urban living	0.45**	1.00	0.63**	7.50
Healthcare access	-0.12	0.63**	1.00	6.80

Source: Field survey 2023

This table presents the results of the correlation analysis among the variables. The correlation coefficients are provided in the cells. A positive correlation of 0.45** is observed between disease transmission and urban living, indicating that as urban living conditions improve, perceptions of disease transmission tend to increase. Similarly, there's a strong positive correlation of 0.63** between urban living and healthcare access, suggesting that better urban living conditions are associated with improved healthcare access. However, there's a weak negative correlation of -0.12 between disease transmission and healthcare access, suggesting a slight inverse relationship between perceptions of disease transmission and healthcare access.

Summary of findings

This study aimed to investigate the impact of urban proximity on the spread of infectious diseases in Onitsha, Anambra State, Nigeria. The research utilized a mixed-methods approach to comprehensively explore the complex interplay between urbanization and disease transmission. The key findings are summarized below:

Thematic analysis results: Thematic analysis of qualitative interviews revealed several critical themes related to disease transmission in Onitsha. Participants highlighted the role of close interpersonal interactions, confined living spaces, and cultural practices in facilitating disease spread. Poor sanitation infrastructure and inadequate healthcare access were identified as key challenges exacerbating transmission.

Quantitative analysis results: The structured surveys provided quantitative insights into disease transmission patterns, urban living conditions, and healthcare access. The majority of respondents perceived a significant impact of urban proximity on disease transmission. Urban living conditions, such as overcrowding and limited sanitation facilities, were associated with higher perceived risks of disease spread. Moreover, respondents indicated that healthcare access in densely populated areas was often constrained, leading to challenges in disease prevention and control.

Inferential analysis results: The inferential analysis, including correlation analysis, revealed significant relationships among variables. Positive correlations were observed between urban living conditions and perceptions of disease transmission, as well as between urban living conditions and healthcare access. However, a weak negative correlation was found between disease transmission perceptions and healthcare access, suggesting that better healthcare access might mitigate perceived disease risks.

Research objectives achieved: The study successfully achieved its research objectives by uncovering the nuances of infectious disease transmission in the context of urban proximity. It shed light on the interplay of factors such as close interpersonal interactions, urban living conditions, and healthcare access in driving disease spread within Onitsha.

These findings contribute to the understanding of how urban proximity impacts disease transmission in densely populated areas like Onitsha. The insights gained from this study hold implications for public health policies and interventions aimed at mitigating the risk of infectious diseases in urban settings.

Discussions

The findings of this study provide a comprehensive understanding of the intricate relationship between urban proximity and the accelerated spread of infectious diseases within densely populated areas like Onitsha, Anambra State, Nigeria. The discussion delves into the implications of these findings within the broader context of public health and suggests potential strategies to address the challenges identified.

The thematic analysis underscores the pivotal role of urban proximity in shaping disease transmission dynamics. The close interpersonal interactions and confined living spaces within urban areas create an environment conducive to the rapid spread of infectious diseases. These findings align with the study by [7], which emphasized the role of overcrowding and high population density in facilitating disease propagation. The interconnectedness of urban communities and the ease of pathogen exchange contribute to the heightened vulnerability of residents to infectious diseases, which is in line with the observations of [29]. Additionally, the study by [15] highlights the influence of cultural practices on disease dynamics, further emphasizing the complexity of the urban context in disease transmission.

The study identifies distinct urban factors that amplify susceptibility to infectious disease transmission in Onitsha. The inadequate sanitation infrastructure and limited access to healthcare services contribute to the challenges faced by urban populations. These findings align with the "urban health penalty" theory proposed by [11], which emphasizes the impact of social determinants of health on disease susceptibility within urban areas. The study area, Onitsha, presents a microcosm of the broader challenges posed by urbanization in Nigeria, reflecting the observations of [19].

The implications of these findings for public health policies are profound. Addressing the challenges posed by urban proximity in disease transmission requires a multi-faceted approach. Firstly, interventions aimed at improving sanitation infrastructure and ensuring access to clean water are critical to reducing the risk of disease transmission. This recommendation resonates with the insights of [9], who emphasize the impact of changing environments on disease vectors. Secondly, enhancing healthcare access through the establishment of clinics, and health centers, and promoting health awareness campaigns can contribute to effective disease control strategies. These recommendations are consistent with the insights of [21], who highlights the significance of healthcare access in disease prevention.

Limitations and future research

It is essential to acknowledge the limitations of this study. The findings are context-specific to Onitsha and may not be entirely generalizable to other urban settings. Moreover, the study focused on the perceptions and experiences of residents, which may introduce biases in reporting. Future research could involve a longitudinal study to capture the temporal dynamics of disease transmission and the effectiveness of interventions over time.

Conclusion and recommendations

Conclusion

In conclusion, this study sheds light on the intricate relationship between urban proximity and the accelerated spread of infectious diseases within densely populated areas, using Onitsha, Anambra State, Nigeria as a case study. The findings highlight the critical role of close interpersonal interactions, confined living spaces, and inadequate infrastructure in facilitating disease transmission. The "urban health penalty" theory's applicability emphasizes the significance of social determinants of health in urban disease dynamics. Policymakers and public health officials should address sanitation, healthcare access, and cultural practices to mitigate disease risks. This study contributes to a deeper understanding of urban health challenges and offers valuable insights for tailored interventions to enhance disease prevention and control strategies. Ultimately, these efforts can safeguard the health and well-being of urban populations, fostering sustainable development and improved quality of life.

Recommendations

Based on the findings of this study, several recommendations are put forth to address the challenges and implications of urban proximity on the spread of infectious diseases in densely populated areas like Onitsha, Anambra State, Nigeria:

1. Improved sanitation infrastructure: Efforts should be directed towards enhancing sanitation facilities and promoting proper waste management practices. Adequate sanitation can significantly reduce the breeding grounds for disease vectors and pathogens.

2. Healthcare access enhancement: Ensuring easy access to healthcare services is crucial. The establishment of health clinics and centers within urban areas, coupled with health awareness campaigns, can enhance early disease detection and timely treatment.

3. Health education programs: Public health campaigns should be tailored to address cultural practices and behaviors that influence disease transmission. Raising awareness about hygiene, sanitation, and disease prevention can empower communities to take proactive measures.

4. Strengthening urban planning: Urban planning policies should prioritize adequate spacing and infrastructure to minimize overcrowding and facilitate social distancing during disease outbreaks.

5. Interdisciplinary collaboration: Collaborative efforts between public health authorities, urban planners, local governments, and community stakeholders can yield holistic approaches to disease prevention and control.

6. Longitudinal studies: Future research should consider longitudinal studies to capture the dynamics of disease transmission over time. This would provide insights into the effectiveness of interventions and help refine strategies.

7. Capacity building: Local healthcare workers and community leaders should receive training to effectively manage disease outbreaks and disseminate accurate information.

8. Data-driven decision-making: Establishing disease surveillance systems and data collection mechanisms can aid in identifying emerging health threats and guiding targeted responses.

9. Public participation: Engaging communities in decision-making processes related to health interventions can foster ownership and promote sustainable behavioral changes.

10. Policy integration: Health considerations should be integrated into urban development policies, ensuring that infrastructure growth aligns with disease prevention and control objectives.

These recommendations aim to inform policy and practice, guiding efforts to mitigate the impact of infectious diseases in densely populated urban areas. Implementing a comprehensive approach that addresses various dimensions of urban proximity can contribute to healthier, more resilient urban communities.

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