Influence Of Housing Attributes On Residents' Health Outcomes In Abuja, Nigeria

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ARTICLE INFO	ABSTRACT
	This study focused on the impact of housing attributes on residents' health outcomes in Abuja, Nigeria. The objectives of this study were to examine the current state of various housing attributes across selected neighborhoods in Abuja, identify the prevalent health outcomes among residents in the study area, and determine the relationship between the current state of housing attributes and health outcomes in the area. To achieve these objectives, three hundred and seven (307) copies of the questionnaire were administered to residents in three selected neighborhoods across low, medium, and high-density zones in Abuja (Area 2 -Garki, Wuse Zone 7, and Jikwoyi Phase 1 of Abuja Municipal Area Council), with a retrieval rate of 72% (226). The data retrieved from the survey were analysed using a frequency distribution table, weighted mean scores, and logistic regression. This study emphasised that areas with higher-quality housing generally exhibited better health indicators, such as lower prevalence of respiratory issues and infectious diseases. The binary logistic regression analysis revealed that Safety Features (p = 0.01), Water and Sanitation (p = 0.042), and Amenities and Infrastructure (p = 0.038) made unique and significant contributions to health outcomes. The study recommended that the government and municipal authorities collaborate to enhance water and sanitation infrastructure across all neighbourhoods and ensure reliable access to clean water and modern sanitation systems. Urban planners and developers should focus on upgrading amenities and infrastructure in neighbourhoods experiencing variability and inadequacies.

1.0 Introduction

The quality of housing has been acknowledged as a critical determinant of health outcomes among residents (WHO, 2018). As individuals spend a substantial portion of their lives indoors, the conditions of their living spaces play a pivotal role in influencing both physical and mental health. Therefore, the intricate relationship between housing quality and health outcomes has emerged as a paramount concern in contemporary public health discourse. Housing, as a fundamental determinant of health, significantly shapes the well-being and overall quality of life for individuals and communities (WHO, 2018). The relationship between housing attributes and health outcomes is multifaceted, involving complex interactions with various socio-economic and environmental factors (Rolfe et al., 2020; Turcu et al., 2021). The attributes of housing, including design, ventilation, space adequacy, sanitation, safety features, and location, significantly influence health outcomes (Krieger & Higgins, 2002). Exploring potential associations and causative factors, such as socio-economic status, education, and access to healthcare services, is critical to unraveling the underlying mechanisms linking housing attributes to health outcomes. A comprehensive assessment of these factors will provide a nuanced understanding of the complex interplay between housing attributes and health outcomes.

Globally, studies have shown that substandard housing contributes to higher rates of morbidity and mortality, particularly among vulnerable populations (Gibson et.al., 2011; WHO, 2018). Inadequate ventilation, overcrowding, dampness, exposure to hazardous building materials, and poor sanitation systems are among the critical risk factors linked to negative health outcomes (Krieger & Higgins, 2002). The World Health

Organisation (2023) estimates that approximately 4 million premature deaths annually are attributable to illnesses related to household air pollution and inadequate housing conditions. According to the World Health Organisation (2018), addressing housing-related health risks is essential for achieving better health equity and improving the quality of life.

In developing regions, including Nigeria, several studies have shown that the relationship between housing and health is often exacerbated by poverty, poor urban planning, and limited enforcement of housing standards (Ajakaiye & Adeyeye, 2002; Ezeh et al., 2017). Additionally, the challenge of maintaining healthy housing conditions in developing nations is intensified by rapid urbanisation, restricted access to basic services, corruption, high inflation, elevated building material costs, and weak enforcement of building regulations (UN-HABITAT, 2020). As urban centres expand, the demand for affordable housing often leads to the proliferation of informal settlements and slums where health and safety standards are compromised (WHO & UN-Habitat, 2010). Despite the recognised link between housing and health, there is still limited empirical research specifically examining how different housing attributes affect residents' health within Abuja's diverse housing environments, ranging from low- to medium- to high-density areas.

Also, housing attributes, such as safety, sanitation, and accessibility to healthcare services, among others, play a significant role in shaping health outcomes (Firdaus & Ahmad, 2012; Richards et al., 2023). Identifying these specific features within the study area is essential for understanding the nuanced ways in which housing attributes directly impact residents' health outcomes. This knowledge will contribute to the development of targeted interventions to address the root causes of health disparities related to housing attributes. There is also an imperative need for a quantitative investigation to establish correlations between health indicators and housing attributes. Scrutinising health metrics aims to quantify the influence of housing attributes on residents' health outcomes by analysing the correlations between selected health metrics and housing attributes. These considerations informed the focus of this paper, which assessed the relationship between housing attributes and residents' health outcomes in Abuja. This paper endeavours to address this imperative by examining prevalent health outcomes among residents of Abuja, Nigeria, and the impact of housing conditions on their health. Thus, this study will provide valuable insights for policymakers, urban planners, and public health professionals to design interventions that promote healthier living environments.

2.0 Literature Review

Housing quality involves evaluating multiple parameters. A succinct evaluation of housing quality includes structural integrity- the internal and external structure of a dwelling place (Sinha et al., 2017). A broader definition may include features of the neighbourhood, such as environmental quality, safety, accessibility, affordability, availability, and quantity, at the precise local level (D'Alessandro & Appolloni, 2020). These parameters contribute to the overall livability and suitability of housing for its occupants. In assessing the quality or suitability of housing, qualitative studies have identified some criteria as relevant indicators for quality evaluation in residential development. Acre & Wyckmans (2014) acknowledged aesthetics, ornamentation, sanitation, drainage, age of the building, access to basic housing facilities, burglary, spatial adequacy, noise level within the neighbourhood, sewage and waste disposal, air pollution, and ease of movement, among others, as relevant housing attributes that influence housing quality. However, Ganiyu et al. (2015) stated that qualitative housing involves the provision of infrastructure services that promote sustainable growth and development by improving environmental conditions and livelihoods.

Given the plethora of international studies examining housing quality, this study primarily emphasises those conducted in the past decade. Several works of literature can be categorised into two main themes: studies addressing healthy housing quality and studies that gauge overall residential satisfaction and quality of life. Mridha (2015) investigated the components of residential satisfaction of dwellers living in developer-built medium-rise apartment buildings in Dhaka, the capital city of Bangladesh. The study reported that the apartment building's location was an important predictor of overall residential satisfaction. Le et al. (2016) investigated social housing to meet the welfare needs of regular citizens of Vietnam by comparing quality and cost across apartments. It was observed that construction quality is considered redundant, as investors tend to prioritise the "price" factor, leading to long-term effects on users. The study also revealed that the quality of construction is the main reason people's faith in the social housing system is diminishing.

Kang et al. (2014) evaluated the health performance of high-density, high-rise public housing in Korea using the existing 'Health Performance Indicator for Public Housing' to compare and analyse the characteristics as evaluated by experts and residents. The survey revealed that residents indeed have high awareness of the visible impacts of the various components in their apartments, indicating a partial difference compared to that reported by the experts. Similarly, Bennett et al. (2016) tested the rental housing warrant of fitness to assess its practicality and utility for improving housing quality in terms of health and safety in China. The study revealed that the houses had numerous health and safety defects, many of which could be rectified relatively easily at a low cost. The most common reasons were unsafe water temperature, no security stay, no smoke alarms, no fixed heating, and unsuitable handrails/balustrades.

In Nigeria, as in many other developing countries, housing quality, as measured by housing attributes, has long been identified as a critical issue influenced by rapid urbanisation, inadequate infrastructure, socio-economic disparities, and housing policies. Numerous literatures have evaluated various indicators, including access to

basic amenities such as water, sanitation, electricity, and healthcare services; physical condition; safety and security; affordability; location; housing environment; accessibility and design; spatial quality; and ventilation and indoor air quality, which are essential for enhancing the quality of housing and improving residents' well-being, to determine the overall livability, safety, and functionality of residential structures.

Adetunji & Isah (2015) assessed residents' satisfaction with the physical condition of residential housing in Lokoja, Nigeria. A survey-based study approach was adopted. Copies of the structured questionnaire were administered to the residents across different types of housing areas in Lokoja (high-income, medium-income, and low-income neighbourhoods). Poor housing conditions were found to have potential negative impacts on the health and well-being of occupants. The findings of the study align with broader research linking poor housing quality to adverse health outcomes and reduced quality of life, particularly in developing urban settings like Nigeria. Although Adetunji & Isah (2015) assessed housing conditions in Lokoja, a gap remains in understanding the current housing challenges in other major urban centres, such as Abuja. Additionally, given that the study is nearly a decade old, more recent research is needed to reflect how housing attributes influence residents' health outcomes holistically.

Mbazor (2018) studied the housing conditions of households residing within Akure City. The findings of the study revealed widespread housing and environmental inadequacies, characterised by the absence and deterioration of essential housing facilities. Additionally, there was a lack of public infrastructural services such as piped water, well-maintained roads, and drainage systems. The study conducted in 2018 predates major events such as the COVID-19 pandemic, which influenced housing needs, including increased demand for healthier indoor environments, an accelerated rise in building material costs, recent economic downturns, and urban policy reforms. Therefore, new studies are needed to capture the post-COVID-19 pandemic realities of housing and infrastructure, a gap this study aims to fill.

Adedire (2017) examined housing quality in peri-urban settlements within Lagos, revealing a pattern of neglect stemming from the perceived lack of economic contribution of these areas to state development, coupled with their locational disadvantage. Consequently, these settlements, consistent with previous research such as Dutta (2012), face myriad challenges, including inadequate sanitary conditions, prolonged commuting times, traffic congestion, pollution, deficient water supply and sanitation infrastructure, improper solid waste disposal practices, and a deficiency of open spaces.

Aliu & Adebayo (2010) investigated the relationship between housing conditions and health outcomes among residents in Lagos. The study identified malaria, typhoid, and diarrhoea as the community's predominant environmental and housing-induced illnesses. The findings of Aliu & Adebayo (2010) highlighted the significant influence of poor housing conditions on the residents' health outcomes, with malaria and typhoid being more prevalent than diarrhoea. The study further revealed the prevalence of overcrowded housing units lacking modern sanitation facilities, such as water closets and tiled bathrooms. Additionally, issues such as inadequate cross-ventilation and structural defects, including cracked walls and broken roofs, were common in the surveyed housing units.

Historically, poor hygiene practices have been implicated in the spread of infectious diseases, leading to numerous health risks (Bartram & Cairncross, 2010). According to Uzochukwu et al. (2015), despite advancements, a significant portion of the population, as indicated by 82% of participants in a recent study, still neglects proper hygiene due to inadequate water and sanitation infrastructure. Moreover, 38.5% of participants reported various health issues, including malaria and respiratory ailments. This lack of access to clean water forces individuals to rely on contaminated sources for daily activities, thereby exacerbating health risks. Lanrewaju (2012) observed that disparities in access to basic amenities, such as treated water and housing, contribute to the health crisis in Nigeria, particularly in rural and urban areas.

3.0 Materials and Methods

This study employed a quantitative research approach to assess housing attributes in selected neighbourhoods in Abuja and their relationship with residents' health outcomes. The target population for this study comprised residents in three selected neighbourhoods across the low, medium, and high-density zones in Abuja: Area 2 (Garki), Wuse Zone 7, and Jikwoyi Phase 1 of the Abuja Municipal Area Council, respectively. This research also elicited information on the prevalent health outcomes of residents from the medical practitioners in the study area. Stratified sampling was employed to select one neighbourhood from each of the low-, medium-, and high-density zones in Abuja, while random sampling was used to select housing units and residents within each population-density zone. To obtain an adequate sampling frame for this study, the total number of residential spaces in Area 2 (Garki), Area 1, and Wuse Zone 7 was obtained from the Abuja Geographic Information System (AGIS). The spread of residential buildings across population density zones is shown in Table 1.

Table 1: Sampling Frame (Residential buildings across the population density zones)

S/N	Population Density Zone	Residential Buildings	% Representation
1	Area 2 (Low density)	150	11.4

2	Wuse Zone 7 (Medium density)	320	24.2
3	Jikwoyi Phase 1 (High density)	850	64.4
	Total	**1320**	**100**

Source: Abuja Geographic Information System (AGIS), 2024.

To determine the sample size of the residential buildings in the study area whose population is finite, Yamane (1973) in Singh and Masuku (2014) was adopted.

The formula is given as: $n = \frac{N}{1+N(e)^2} \dots \dots \dots \dots \dots \dots \dots \dots (i)$

Where:

n = Sample size to be studied;

N= Population size; and

e = level of precision = 5%

Using the above formula, the sample size for the residential houses is:

$$n = \frac{1320}{1 + 1320(0.05)^2} = 307$$

To ensure proportional representation, the sample size was allocated to each zone in proportion to its percentage of the total sample frame population. Table 2 presents the number of residential buildings to which the questionnaires were administered in each zone.

Table 2: Sample Size

S/N	Population Density Zone	Sampling Frame (Buildings)	Sample Size (Buildings)
1	Area 2 (Low density)	150	35
2	Wuse Zone 7 (Medium density)	320	75
3	Jikwoyi Phase 1 (High density)	850	197
	Total	**1320**	**307**

Source: Author's compilation, 2024.

This study relied on data gathered from primary sources. This involved eliciting data via a structured questionnaire designed to answer the objectives of this research. Copies of the questionnaire were completed by residents in Area 2 (Garki), Wuse Zone 7, and Area 1. The preliminary section of the questionnaire collects background information on the demographic characteristics of the responding residents to assess data quality before analysis and interpretation. This first section provided information on the property's location, the respondents' age range, marital status, occupation, and gender, among others. The other sections of each questionnaire dwelt on housing quality and health outcomes.

Frequency distribution, weighted mean score, one-way ANOVA, and logistic regression were employed to analyse the data collected on the relationship between the current state of the housing attributes parameters and the health outcomes of residents in the study area. The factors (housing quality parameters measured by housing attribute parameters) hypothesised to influence residents' health outcomes, the dependent variable, the independent variables, and their associated measurement scales are outlined in Table 3.

Table 3: Operationalisation of Variables

Variable Code	Description of Variables	Measurement
Dependent Variable		
HCR	Health outcomes of residents	1 if the outcome is good, 0 if otherwise
Independent Variables		
SIY	Structural Integrity	1 if the condition is good, 0 if otherwise
SFS	Safety Features	1 if the condition is good, 0 if otherwise
VIAQ	Ventilation and Indoor Air Quality	1 if the condition is good, 0 if otherwise
THC	Thermal Comfort	1 if the condition is good, 0 if otherwise
WAS	Water and Sanitation	1 if the condition is good, 0 if otherwise
SAL	Space and Layout	1 if the condition is good, 0 if otherwise
AAI	Amenities and Infrastructure	1 if the condition is good, 0 if otherwise

Source: Author's compilation, 2024.

4.0 Results and Discussion

A total of three hundred and seven (307) copies of the questionnaire were administered to residents across selected population density zones. In Area 2, thirty-five (35) copies of the questionnaire were distributed, and twenty-eight (28) copies of the questionnaire were retrieved, yielding an 80% response rate. Seventy-five (75) copies of the questionnaire were distributed at Wuse Zone 7, and fifty-six (56) were returned, resulting in a 74.6% retrieval rate. One hundred and ninety-seven (197) copies of the questionnaire were distributed at Jikwoyi Phase 1, and one hundred and forty-two (142) were returned, achieving a 72% retrieval rate. Overall,

the distribution and retrieval rates reflect effective engagement with respondents, with high retrieval rates across most areas.

4.1 Respondents' Demographic Characteristics

The demographic characteristics of the respondent residents were analyzed to establish the fitness of the retrieved data for use. The result is shown in Table 4 below.

Table 4: Demographic Characteristics of Residents

Demographic Characteristics of Residents		Frequency	Percent (%)
Location of Dwelling	Area 2	28	12.4
	Wuse Zone 7	56	33.6
	Jikwoyi Phase 1	142	54.0
	Total	**226**	**100**
Age of household head	Under 25 years old	13	5.8
	25-40 years old	78	34.5
	41-60 years old	135	59.7
	Over 60 years old	0	0
	Total	**226**	**100**
Employment Status of household head	Employed full-time	97	42.9
	Unemployed	7	3.1
	Self-employed	108	47.8
	Retired	14	6.2
	Total	**226**	**100**
Level of personal or household income	Low income N30,000-N60,000	59	26.1
	Middle/Average income N60,001-N150,000	76	33.6
	High-Income N150,001 and above	91	40.3
	Total	**226**	**100**
Gender of household head	Female	20	8.8
	Male	206	91.2
	Total	**226**	**100**
Marital status	Single	59	26.1
	Married	167	73.9
	Divorced or separated	0	0
	Widowed	0	0
	Total	**226**	**100**
Level of Education of household	No formal education	0	0
	O level or lower	17	7.5
	Some technical or vocational training	7	3.1
	OND/HND/Bachelor's degree	172	76.1
	Advanced degree (Master's, Ph.D., etc.)	30	13.3
	Total	**226**	**100**
Ethnicity/Tribe	Yoruba	108	47.8
	Igbo	51	22.6
	Hausa	67	29.6
	Total	**226**	**100**
Household size (number of people in the family)	Single individual	23	10.2
	A small family (2-3 members)	56	24.8
	Medium-sized family (4-6 members)	133	58.8
	Large family (7+ members)	14	6.2
	Total	**226**	**100**
Number of Adults	1 adult	23	10.2
	2 adults	86	38.1

	3 adults	79	35.0
	4 or more adults	38	16.8
	Total	**226**	**100**
Number of children	No children	44	19.5
	1 child	29	12.8
	2 children	41	18.1
	3 or more children	112	49.6
	Total	**226**	**100**
Duration of Occupation	Less than 2 years	29	12.8
	2-5 Years	104	46.0
	6-10 Years	67	29.6
	More than 10 years	26	11.5
	Total	**226**	**100**

Source: Field Survey, 2024.

The residents' demographic characteristics were thoroughly examined and are detailed in Table 4. The table provides a comprehensive overview of various aspects, including the location of the dwelling, the age of the household head, employment status, income level, gender, marital status, education level, ethnicity, household size, the number of adults and children in the household, and the duration of residence. The distribution of residents by location shows that the majority, 54.0%, live in Jikwoyi Phase 1. Wuse Zone 7 accounts for 33.6% of the population, while Area 2 has the smallest share at 12.4%. The distribution indicates that Jikwoyi Phase 1 accommodates the largest proportion of residents, reflecting its role as a high-density, more affordable residential area. This suggests that the majority of the population in the study area likely falls within the low-to middle-income category, for whom housing affordability is a key consideration. The smaller share of residents in Wuse Zone 7 and Area 2, both relatively more developed and expensive neighborhoods, underscores the socio-economic disparities in housing accessibility within Abuja. These findings highlight the need for inclusive housing policies and investments that improve the affordability and livability of medium- and high-density areas without compromising quality and sustainability. The age distribution of household heads reveals that the largest age group falls between 41 and 60 years old, comprising 59.7% of the total. This is followed by those aged 25-40 years, who make up 34.5%. The youngest age group, under 25 years old, represents 5.8%, and there are no household heads over 60 years old. This suggests a predominantly middle-aged demographic among household heads.

Regarding employment status, most household heads are self-employed, accounting for 47.8%. Those working full-time make up 42.9%. Unemployment among household heads is relatively low at 3.1%, and 6.2% are retired. This suggests a high level of economically active residents, with many engaged in self-employment. Income levels indicate that 40.3% of households fall into the high-income category (N150,001 and above), while 33.6% are middle-income (N60,001-N150,000), and 26.1% are low-income (N30,000-N60,000). This distribution indicates a fairly well-off population with a substantial share of high and middle-income earners. The gender distribution of household heads is heavily skewed toward males, with 91.2% male, while females as household heads are a minority, at 8.8%. This reflects a strong male dominance in the role of household head within this population. Marital status shows that 73.9% are married, and 26.1% are single. There are no divorced, separated, or widowed household heads, indicating a predominantly married population. Educational attainment among household heads is high, with 76.1% holding an OND/HND or Bachelor's degree, and 13.3% possessing an advanced degree (Master's, Ph.D., etc.). Those with O-level or lower education account for 7.5%, and 3.1% have some technical or vocational training. Notably, no household heads lack formal education, reflecting a well-educated community. Ethnically, Yoruba residents form the largest group at 47.8%, followed by Hausa at 29.6% and Igbo at 22.6%. This shows a diverse ethnic makeup with Yoruba and Hausa being predominant.

Household size data show that medium-sized families (4-6 members) are the most common, making up 58.8% of households. Small families (2-3 members) account for 24.8%, while single individuals represent 10.2%. Large families (7 or more members) are the least common, at 6.2%. This suggests a preference for medium-sized family units among residents. The number of adults per household indicates that two-adult households are the most common, comprising 38.1%. Households with three adults make up 35.0%, and those with four or more adults account for 16.8%. Single-adult households are the least frequent at 10.2%. This suggests that most households have multiple adults, with two-adult households especially common. Concerning the number of children per household, nearly half (49.6%) have three or more children. Households with no children make up 19.5%, while those with one or two children account for 12.8% and 18.1%, respectively. This highlights a tendency toward larger families with several children. The length of residence shows that 46.0% of households have lived in their current home for 2-5 years. Those who have lived there for 6-10 years account for 29.6%, and residents with less than two years at their current home make up 12.8%. Households with more than ten years of residence constitute 11.5%. This indicates that many residents have relatively stable housing

arrangements, with nearly half living in their homes for 2 to 5 years. The data suggest that the information provided by respondents is reliable.

4.2 Current State of Various Housing Quality Parameters Across Selected Neighbourhoods of Abuja

In this section, an attempt was made to assess the quality of housing units across the three population-density areas (Area 2, Wuse Zone 7, and Jikwoyi Phase 1) using the condition of the housing attributes. To achieve this, residents across selected neighborhoods were asked to rate the condition of their housing units, following a 7-item assessment checklist on a 5-point Likert scale, where 1 represents 'strongly disagree'; 2 represents 'disagree'; 3 represents 'fairly agree; 4 represents 'agree', and 5 represents 'strongly agree'. The responses were subjected to weighted mean scores. The results are presented in Table 5.

Table 5: Descriptive Statistics for Each Housing Quality Parameter and Neighborhood

Descriptive Statistics for Each Factor and Neighborhood		Mean	Rank
Structural Integrity	Area 2	3.64	1st
	Wuse Zone 7	3.61	2nd
	Jikwoyi Phase 1	3.26	3rd
Safety Features	Area 2	3.47	1st
	Wuse Zone 7	3.14	2nd
	Jikwoyi Phase 1	3.03	3rd
Ventilation and Indoor Air Quality	Area 2	3.78	1st
	Wuse Zone 7	3.61	2nd
	Jikwoyi Phase 1	3.34	3rd
Thermal Comfort	Area 2	3.58	1st
	Jikwoyi Phase 1	3.19	2nd
	Wuse Zone 7	3.14	3rd
Water and Sanitation	Area 2	3.84	1st
	Wuse Zone 7	3.61	2nd
	Jikwoyi Phase 1	3.31	3rd
Space and Layout	Area 2	4	1st
	Wuse Zone 7	3.18	2nd
	Jikwoyi Phase 1	3.05	3rd
Amenities and Infrastructure	Area 2	3.79	1st
	Wuse Zone 7	3.46	2nd
	Jikwoyi Phase 1	3.08	3rd

Source: Field Survey, 2024.

Table 5 above, which presents the descriptive statistics for each housing quality parameter across the three neighbourhoods (Area 2, Wuse Zone 7, and Jikwoyi Phase 1), revealed significant differences in residents' perceptions of housing quality. For structural integrity, Area 2 has the highest mean rating (Mean = 3.64), indicating that residents in this area perceive the structural integrity of their housing to be better than that in Wuse Zone 7 (Mean = 3.61) and Jikwoyi Phase 1 (Mean = 3.26). This pattern is consistent across other quality parameters, suggesting that Area 2 is generally viewed more favourably.

Safety features follow a similar trend, with Area 2 again leading (Mean = 3.47), followed by Wuse Zone 7 (Mean = 3.14), and Jikwoyi Phase 1 (Mean = 3.03). This suggests that residents of Area 2 feel safer compared to those in the other two neighborhoods. When considering ventilation and indoor air quality, Area 2 has the highest mean score (Mean = 3.78), followed by Wuse Zone 2 (Mean = 3.61) and Jikwoyi Phase 1 (Mean = 3.34).

Thermal comfort ratings are highest in Area 2 (Mean = 3.58), while Wuse Zone 7 (Mean = 3.14) and Jikwoyi Phase 1 (Mean = 3.19) have lower scores. This shows that residents of Area 2 perceive their thermal comfort as better. For water and sanitation, Area 2 also scores the highest (Mean = 3.84), followed by Wuse Zone 7 (Mean = 3.61) and Jikwoyi Phase 1 (Mean = 3.31). This indicates that water and sanitation services are considered better in Area 2. Space and layout receive the highest ratings in Area 2 (Mean = 4.00), with Wuse Zone 7 (Mean = 3.18) and Jikwoyi Phase 1 (Mean = 3.05) behind. This suggests that Area 2 offers more satisfactory spatial arrangements. Lastly, amenities and infrastructure get the highest scores in Area 2 (Mean = 3.79), with Wuse Zone 7 (Mean = 3.46) and Jikwoyi Phase 1 (Mean = 3.08) following. According to its residents, Area 2 has better amenities and infrastructure.

Overall, Area 2 consistently ranks highest across all parameters, indicating that it is viewed as the neighborhood with the best housing quality. Wuse Zone 7 usually ranks second, and Jikwoyi Phase 1 ranks third, suggesting that residents of Jikwoyi Phase 1 perceive their housing quality as the lowest among the three neighborhoods. These findings provide a comprehensive overview of the differences in perceptions of housing quality among the neighborhoods. The results show a clear spatial gap in the perceived quality of housing across the studied areas in Abuja. The consistently higher ranking of Area 2 across all parameters suggests that neighborhoods with efficient infrastructure, good planning, and proximity to urban amenities tend to offer

better housing experiences. Conversely, the lower ranking of Jikwoyi Phase 1 highlights ongoing challenges faced by peripheral or developing settlements, such as poor infrastructure, limited access to basic services, and weaker support for urban management. These variations in perceived housing quality have significant effects on urban planning, housing policy, and real estate investment decisions. For policymakers, the results underscore the need to address intra-urban inequalities by prioritizing infrastructure improvements and better service delivery in underperforming neighborhoods. For real estate developers and investors, the findings emphasize the importance of locational features and neighborhood quality in shaping residential satisfaction. Ultimately, this evidence underscores the need to adopt inclusive and sustainable housing development strategies that close the gap between high- and low-performing neighborhoods, thereby promoting fair urban growth and improved living standards in Abuja.

4.3 Health Outcomes Among Residents in the Study Area

This section aims to identify the common health outcomes among residents across selected neighborhoods in the study area. To do this, residents were asked to rate the prevalence of eleven (11) types of health outcomes in their housing units on a 5-point Likert scale, where 1 indicates 'very low prevalence,' 2 indicates 'low prevalence,' 3 indicates 'moderate prevalence,' 4 indicates 'high prevalence,' and 5 indicates 'very high prevalence.' A preliminary investigation was conducted on the health outcomes related to housing in the study area. The responses were analysed using weighted mean scores and ranked in order of descending means, as shown in Table 6.

Table 6: Prevalent Health Outcomes Among Residents Across Selected Neighbourhoods

Prevalent Health Outcomes Among Residents		Mean	Std. Dev	Rank
Respiratory health issues (e.g., respiratory infections, asthma exacerbations, allergic reactions)	Wuse Zone 7	2.13	1.526	1st
	Jikwoyi Phase 1	2.11	1.191	2nd
	Area 2	1.79	0.833	3rd
Sick house syndrome (SBS) symptoms (e.g., headache, sneezing, fatigue, sleep disturbance)	Jikwoyi Phase 1	2.97	1.254	1st
	Wuse Zone 7	2.54	0.744	2nd
	Area 2	1.88	1.182	3rd
Thermal discomfort-related health issues (e.g., heat-related illnesses, cardiovascular stress, stroke)	Jikwoyi Phase 1	2.43	0.742	1st
	Wuse Zone 7	2.39	1.167	2nd
	Area 2	2.16	1.055	3rd
Cold-related health issues (e.g., increased colds and influenza, exacerbation of chronic conditions like arthritis, rheumatism, Parkinson's, diabetes)	Wuse Zone 7	2.53	1.553	1st
	Jikwoyi Phase 1	2.2	1.12	2nd
	Area 2	1.79	0.63	3rd
Negative mental health impacts (e.g., depression, stress, anxiety, social isolation)	Area 2	2.45	1.159	1st
	Wuse Zone 7	2.21	1.067	2nd
	Jikwoyi Phase 1	2.11	1.115	3rd
Malaria	Jikwoyi Phase 1	3.28	0.826	1st
	Wuse Zone 7	3.07	1.141	2nd
	Area 2	2.54	1.201	3rd
Typhoid	Jikwoyi Phase 1	2.93	1.214	1st
	Wuse Zone 7	2.76	1.094	2nd
	Area 2	2.54	1.201	3rd
Diarrhea	Area 2	2.86	0.651	1st
	Wuse Zone 7	2.67	1.04	2nd
	Area 2	2.26	1.427	3rd
Cholera	Jikwoyi Phase 1	2.71	0.713	1st
	Wuse Zone 7	2.11	1.107	2nd
	Area 2	1.96	1.553	3rd

Source: Field Survey, 2024.

Table 6 presents the weighted mean score analysis of prevalent health outcomes among residents in Wuse Zone 7, Jikwoyi Phase 1, and Area 2, revealing several key findings. The low mean scores in the results indicate a relatively lower prevalence or severity of specific health outcomes among residents in the respective neighbourhoods. In the context of respiratory health issues, Area 2 has a mean score of 1.79 with a standard deviation of 0.833, which suggests that respiratory health issues are less common or less severe in Area 2 compared to Wuse Zone 7 and Jikwoyi Phase 1. This could be attributed to better air quality, fewer environmental pollutants, or more effective healthcare interventions in Area 2. Similarly, the lower mean score

for Sick House Syndrome (SBS) symptoms in Area 2 (mean of 1.88 with a standard deviation of 1.182) indicates that residents in this area experience fewer symptoms associated with poor indoor air quality or inadequate ventilation compared to those in Wuse Zone 7 and Area 3. This may reflect better building standards, reduced exposure to indoor pollutants, or increased awareness and mitigation of SBS factors in Jikwoyi Phase 1. The results imply a spatial disparity in environmental health conditions across the studied neighborhoods. The lower mean scores in Area 2 suggest that residents experience fewer or less severe respiratory and Sick Building Syndrome (SBS) symptoms, which may be linked to better housing design, improved ventilation, and lower exposure to environmental pollutants. This indicates that Area 2 likely benefits from superior environmental management and higher building standards compared to Wuse Zone 7 and Jikwoyi Phase 1. Conversely, the higher mean scores observed in the latter areas highlight potential environmental health risks associated with inadequate ventilation, overcrowding, or poor construction quality. These findings underscore the importance of integrating health-oriented design standards and sustainable building practices into residential developments, particularly in high-density and rapidly urbanising neighborhoods like Jikwoyi Phase 1.

For thermal discomfort-related health issues, Area 2 has the lowest mean score of 2.16, with a standard deviation of 1.055, indicating that fewer residents experience heat-related illnesses. This may be due to better building insulation, more effective use of cooling systems, or other adaptive measures that reduce thermal stress. In the case of cold-related health issues, the lower mean score in Area 2 (mean of 1.79 with a standard deviation of 0.63) suggests that residents in this area are less affected by cold weather conditions. This could be due to better heating systems, more effective insulation, or fewer residents with conditions exacerbated by cold. Regarding negative mental health impacts, Area 2 has a lower mean score of 2.11 with a standard deviation of 1.115, indicating that residents there report fewer mental health issues, such as depression, stress, or anxiety, compared to Wuse Zone 7 and Jikwoyi Phase 1. This might be attributed to better social support systems, less stressful living conditions, or more effective mental health services.

In terms of malaria prevalence, Area 2 has a lower mean score of 2.54 with a standard deviation of 1.201, indicating fewer cases compared to Wuse Zone 7 and Jikwoyi Phase 1. This could be due to more effective vector control measures, better healthcare services, or lower exposure to malaria vectors. For typhoid, the lower mean score in Area 2 (mean of 2.54 with a standard deviation of 1.201) suggests fewer cases compared to Jikwoyi Phase 1 and Wuse Zone 7, potentially indicating better sanitation and water quality. The findings suggest notable spatial disparities in public health outcomes across the studied neighborhoods. The lower mean scores for malaria and typhoid in Area 2 indicate comparatively better living and environmental conditions, likely supported by effective vector control measures, improved access to healthcare, and superior water and sanitation infrastructure. In contrast, the higher prevalence of these diseases in Wuse Zone 7 and Jikwoyi Phase 1 may reflect inadequate waste management, poor drainage systems, and limited access to clean water or health services. These patterns underscore the significant connection between housing attributes, infrastructure provision, and public health. The results underscore the need for targeted interventions to improve sanitation, drainage, and healthcare delivery, particularly in high-density areas such as Jikwoyi Phase 1, in order to reduce the disease burden and enhance overall neighborhood livability.

The lower mean score for diarrhea in Area 2 (mean of 2.26 with a standard deviation of 1.427) indicates fewer incidents of this health issue compared to the other areas, suggesting better hygiene practices, cleaner water supply, or more effective public health interventions. Lastly, the lower mean score for cholera in Area 2 (mean of 1.96 with a standard deviation of 1.553) implies fewer cases compared to Jikwoyi Phase 1 and Wuse Zone 7. This may indicate better water and food safety practices, more effective public health measures, or fewer outbreaks of the disease in this area. The low mean scores across these various health outcomes suggest that residents in the respective areas with lower scores experience fewer health issues related to these factors. This reflects differences in environmental conditions, public health interventions, infrastructure quality, and overall living conditions that influence health outcomes in each neighbourhood.

4.4 Logistic Regression Analysis of the Relationship between the Current State of the Housing Quality and Health Outcomes in the Study Area

This section examines the relationship between the current housing quality parameters and health outcomes in the study area using logistic regression. The dependent variable is residents' health outcomes, while the independent variables include the seven main housing quality parameters: structural integrity, safety features, ventilation and indoor air quality, thermal comfort, water and sanitation, space and layout, and amenities and infrastructure. This section presents the results of binary logistic regression, displays the significance in Table 7, and discusses how each independent variable affects residents' health outcomes.

Table 7: Logistic Regression Analysis of the Relationship between the Current State of the Housing Quality and Health Outcomes

Independent Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Structural Integrity	0.445	0.677	0.432	1	0.511	1.561	0.414	5.89
Safety Features	0.191	0.662	0.083	1	0.01*	1.21	0.331	4.43
Ventilation and Indoor Air Quality	0.103	1.034	0.01	1	0.921	1.108	0.146	8.41
Thermal Comfort	-1.03	1.101	0.87	1	0.351	0.358	0.041	3.1

Space and Layout	-0.41	0.796	0.261	1	0.609	0.666	0.14	3.17
Water and Sanitation	1.896	0.817	5.384	1	0.042*	6.658	1.342	33
Amenities and Infrastructure	-0.67	0.801	0.689	1	0.038*	0.514	0.107	2.47
Constant	1.785	0.777	5.285	1	0.022	5.961		

Model χ² (7, N = 226) = 72.81
Pseudo R² = 91%

Source: Field Survey, 2024

Direct logistic regression was performed to assess the relationship between several factors (housing quality parameters) and the likelihood that a resident's health outcome would not be significant. The model contained seven independent variables (structural integrity, safety features, ventilation and indoor air quality, thermal comfort, water and sanitation, space and layout, and amenities and infrastructure). The full model chi-square test, which included all predictors, was statistically significant, $\chi2(7, N = 226) = 72.81$, $p < .001$, indicating that the model provided a good fit and distinguished between respondents who received compensation and those who did not. The model as a whole explained between 5.1% (Cox and Snell R²) and 11.6% (Nagelkerke R²) of the variance in compensation status. The pseudo-R² value of 0.91 suggests that the model explained and classified a substantial portion of the variance in health outcomes, underscoring its robustness. As shown in Table 7, only three of the independent variables made a unique statistically significant contribution to the model (Safety Features, Water and Sanitation, and Amenities and Infrastructure). The strongest predictor of residents not having a good health outcome was Water and Sanitation, with an odds ratio of 6.658. This indicates that residents without access to clean water and adequate sanitation facilities were over six times more likely to experience poor health outcomes than those with access to good sanitation facilities, after controlling for all other factors (housing quality parameters) in the model. The odds ratio of 0.514 for Amenities and Infrastructure was less than 1, indicating that for every additional inadequate amenity and infrastructure available to a resident, they are 0.514 times less likely to have a good health outcome, controlling for other factors (housing quality parameters) in the model. Table 7 further revealed that three (3) of the independent variables in the model had negative B values, indicating that an increase in the independent variable score will result in a decreased probability of the case scoring 1 on the dependent variable (good health outcome). Thus, an increase in inadequate thermal comfort (*B* = -1.03), inadequate space and layout (*B* = -0.41), and inadequate amenities and infrastructure (*B* = -0.67) reduces the likelihood that a resident will experience a good health outcome.

The other variables, including structural integrity (B = 0.445, p = 0.511), ventilation and indoor air quality (B = 0.103, p = 0.921), thermal comfort (B = -1.03, p = 0.351), and space and layout (B = -0.41, p = 0.609), were not found to be significant predictors of health outcomes in this analysis. The statistically significant relationship between water and sanitation, safety features, amenities, infrastructure, and residents' health outcomes underscores the critical role of basic housing quality parameters in shaping urban well-being. The strong predictive power of Water and Sanitation indicates that inadequate access to clean water and hygienic facilities significantly increases residents' vulnerability to poor health. This highlights the need for policymakers and estate developers to prioritise investments in water infrastructure, drainage, and waste management systems within residential areas.

Furthermore, the negative effects of inadequate thermal comfort, space, and amenities on health outcomes suggest that overcrowded living conditions, poor ventilation, and a lack of basic facilities contribute to unhealthy environments. Urban planners and local authorities should, therefore, enforce minimum housing standards and promote sustainable building designs that enhance livability and resilience. Strengthening inter-sectoral collaboration between health, housing, and environmental agencies would also be crucial to ensuring healthier residential environments in Abuja and similar urban contexts across Nigeria.

Conclusion

This study assessed the impact of housing quality on residents' health outcomes in Abuja, Nigeria, by examining the current state of various housing quality parameters across selected neighborhoods, identifying the prevalent health outcomes among residents across selected neighborhoods, and determining the relationship between the current state of the housing quality parameters and health outcomes in the study area. The research revealed significant disparities in housing quality across neighborhoods in Abuja, affecting residents' overall living conditions and health outcomes. The study showed that the low population density area (Area 2) consistently rated higher than the medium density area (Wuse Zone 7) and the low-density area (Jikwoyi Phase 1) in several housing quality parameters, including structural integrity, safety features, ventilation and indoor air quality, water and sanitation, space and layout, and amenities and infrastructure. In addition, Area 2, which features higher-quality housing, generally exhibited better health indicators, including lower respiratory disease prevalence, fewer cold-related illnesses, and fewer cases of malaria, typhoid, cholera, and other infectious diseases. The analysis of the relationship between housing quality and health outcomes showed that the housing parameters contributing to residents' health outcomes are Safety Features, Water and Sanitation, and Amenities and Infrastructure. Overall, this research contributes valuable insights into the field of housing quality and its implication on health outcomes, providing policymakers, urban planners, real estate developers, and public health professionals with a deeper understanding of the keen impact of housing quality

on public health, enabling them to develop targeted interventions that address housing-related health disparities, promoting public health and improving housing standards in diverse urban and rural settings. Addressing disparities in housing conditions, enhancing sanitation infrastructure, and improving access to essential services are crucial steps towards promoting better health outcomes and overall well-being in urban settings. Future policies and interventions should prioritise equitable housing development strategies to mitigate health disparities and enhance community health resilience.

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