

MINIMISING HEALTH RISKS AND ENHANCING RESIDENTIAL BUILDING OCCUPANTS' SAFETY IN NIGERIA

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Article DOI:

www.doi.org/10.53700/jrap3322023_1

Article Citation:

Akande O. K., et al., 2023, Minimising Health Risks and Enhancing Residential Building Occupants' Safety in Nigeria, *Journal of Research in Architecture and Planning*, 33(2). 1-18.



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ABSTRACT

Housing as an essential component of human life has not been given prominence in global health. Meanwhile, housing conditions can significantly impact the physical, mental, and social well-being of residents. In Nigeria, poor housing habitability is a threat to public health which has exacerbated building-related illnesses (BRI), and triggered outbreaks of infectious diseases among the residents. This research examined the quality of housing and habitability provision in Nigeria with a view to minimise health risks and enhance the residents' physical, mental, and social well-being. A structured questionnaire was administered to 120 respondents to solicit relevant data for the study. Descriptive and inferential statistics were used to analyse the collated data at various levels of the research. Findings indicate a significant effect of poor housing conditions such as inadequate ventilation, dampness, and overcrowding on the wellbeing of occupants in dwellings, which lead to outbreaks of infectious diseases such as respiratory illnesses, allergies, and psychological distress. The study concludes that inadequate and poor housing quality promote poor building habitability, causing outbreak of infectious diseases and increased health risk for occupants. The study recommends that authorities in the housing sector should provide policies to ensure adequate and well-constructed housing for adequate habitation, promoting health and safety of occupants and reducing the rate of outbreaks of infectious diseases. Also, there should be continuous public enlightenment among the people on the health implications of their living conditions to minimise health risk.

Keywords: Building habitability, diseases outbreak, health risk, residential houses, occupants safety, Nigeria.

INTRODUCTION

Housing is a significant factor in determining health, and inadequate housing is a serious public health problem (Krieger and Higgins 2002). Globally, World Health Organisation WHO (2009) evaluated the health status of Nigerians and reported that there is evidence that the main health indicators are impacted by housing conditions that results in outbreak of infectious diseases. Despite slight improvements, these problems have either persisted or gotten worse, and Nigeria's health outcome indicators are still high. Household and

ambient air pollution is responsible for 99 deaths per 100,000 people (Anaemene, 2017). Housing quality, cost, location, social and community features are main factors that research has consistently shown to have significant impact on health (Rolfe et al., 2020).

For most countries in the globe, especially the developing ones, providing appropriate, high-quality housing for the populace has always been a big issue and task (Asa et al., 2017). Based on a variety of housing and health data sources, poor housing is linked to an increased risk of cardiovascular

diseases, respiratory diseases, depression and anxiety, rheumatoid arthritis, nausea and diarrhoea, infections, allergic symptoms, hypothermia, and physical injury from accidents (Rolfe et al., 2020). Improving housing conditions can both improve health and save money, as people with poor health and wellbeing are more likely to reside in subpar housing (WHO 2009). Numerous illnesses have been connected to substandard housing habitability. Few African nations are exempt from the housing shortage (Anaemene, 2017) while in Nigeria, between 14 and 16 million people lack access to suitable housing (Fakunle et al., 2018).

It is imperative that people's living conditions be improved in every society. The residential space of a person's house has a significant impact on his or her health and well-being. People's everyday lives are fundamentally shaped by where they live (Olukolajo et al., 2013). Howden-Chapman et al., (2011) posited that physically safe homes are essential for maintaining good physical and mental health. It can significantly improve health when suitable housing shields people and families from risky exposures and gives them a sense of security, privacy, stability, and control. Contrarily, poor housing adds to health issues such of injuries, chronic illnesses, infectious diseases, and a lack of healthy children development (Krieger and Higgins 2002). Poor housing habitability, such as crowded living quarters, insufficient ventilation, dampness, and mould, can cause a variety of health issues, such as allergies, asthma, and respiratory disorders (Holden et al., 2023).

It has been demonstrated that the well-being of people is significantly influenced by the standard of housing conditions. Furthermore, the housing stock has been under strain due to rapid urbanisation and population increase in many regions of the world, which has resulted in the spread of overcrowded and substandard housing (Odoyi and Riekkinen 2022). This trend is especially noticeable in developing nations like Nigeria, where the rise of slums and informal settlements was fueled by a lack of affordable housing. Furthermore, poor housing conditions can worsen social isolation, stress, and mental health consequences, particularly in low-income and vulnerable groups (Novak et al., 2019).

There is currently a dearth of research that examines the connection between housing conditions and well-being, particularly in low-income and marginalised groups, despite growing recognition of the significance of housing conditions for people' well-being (Sano et al., 2021). This research gap emphasises the importance of policymakers and practitioners in understanding the effects of substandard housing

circumstances and creating practical plans for enhancing housing habitability and enhancing inhabitants' wellbeing and reduce health risk. The objectives are: (i) To investigate the links between housing conditions, occupants' well-being and the rate of outbreak of infectious diseases (ii) To identify factors that influence the quality of housing that result to poor building habitability. (iii) To determine strategies for improving housing conditions and minimize health risk by promoting the well-being of residents. The research is guided by examining the following hypothesis:

H0: There is no significant relationship between housing conditions on the well-being of occupant in residential dwelling

H1: There is a significant relationship between housing conditions on the well-being of occupant in residential dwelling

LITERATURE REVIEW

Housing is defined by the World Health Organisation (WHO, 2009) as a residential environment that comprises the physical structure used for shelter as well as any services, facilities, equipment, and devices required or wanted for the family's and individual's social, physical, and mental well-being. The built environment and housing have a significant impact on how people's health is shaped. Inadequate housing has historically contributed to the spread of disease, impacted people's physical and mental health, and raised mortality rates. To maintain wholesome living circumstances, public health measures have been implemented throughout modern history, including slum clearance, sanitation, and the provision of inexpensive housing (Ferguson et al., 2020).

Increased human well-being and ultimately decreased health care expenses should result from the provision of sufficient housing. But there is little research to back up these assertions; rather, it primarily focuses on the health effects of outside risks in the vicinity of residences (Palacios et al., 2020). Housing is more than just a physical structure; it also refers to the quality and condition of a home, as outlined in Maslow's hierarchy of needs (Hablemitolu et al., 2010). Proper housing is crucial for security, healthy growth, and overall well-being. Poorly maintained housing increases the risk of harm and injury, impacting the entire family's wellness (Krieger and Higgins 2002).

Several strategies can be used to reduce health risks and improve the safety of residents of residential buildings. Investigating the application of architectural strategies to

improve building occupant safety is one strategy (Isah et al., 2023). Understanding how indoor environmental quality (IEQ) affects occupant health and designing buildings with the best possible IEQ to protect health are also crucial (Glauberman, 2020). Furthermore, it is critical that residential building design take into account the unique needs of vulnerable groups, including the elderly, those with disabilities or chronic illnesses, and those from socioeconomically disadvantaged backgrounds (Awada et al., 2020). The indoor environmental quality, building design, and security measures are the main factors that affect health risks and safety of occupants of residential buildings. In addition to having an impact on indoor air quality (IAQ), factors like temperature, humidity, natural lighting, ventilation, and privacy in the room are crucial for overall comfort satisfaction (Mewomo et al., 2021).

Improving occupants' health and wellbeing requires ongoing building monitoring as well as fixing technical or design flaws. In order to promote zero-energy buildings, maintain indoor air quality, and lower health risks, ventilation must be balanced. Well-being and health are significantly impacted by housing conditions. Poor housing, linked to respiratory, cardiovascular, and infectious diseases, is especially valuable for vulnerable populations like low-income individuals, ethnic minorities, and indigenous peoples (Howden-Chapman et al., 2022). Living space shortage has been identified as a risk factor for mental and behavioural illnesses, such as schizoaffective and schizophrenia disorders (Pevalin et al., 2017).

Furthermore, housing conditions may have an impact on indoor air quality and increase the chance of contracting infectious diseases (Akande et al., 2023). The necessity of safe and comfortable living conditions has been underscored by COVID-19 pandemic, as evidenced by lockdowns and reduced mobility (Capasso and D'Alessandro 2021). When viewed holistically and inclusively, housing retrofits and urban development have the potential to improve health and wellbeing. Housing is regarded as a critical infrastructure for enhancing and maintaining health and wellbeing outcomes (O'Sullivan et al., 2023). In relation to public health and well-being, housing conditions including the calibre of the building materials used, the structural integrity of the building, and the spatial arrangement have been the subject of research and policy (Stachura, 2013).

The total quality of living is largely influenced by the state of the internal and external housing environments. Empirical studies have demonstrated that the state of housing can directly impact homeowners' contentment with their homes

(Kumar et al., 2021). Multidimensional approaches have been used to evaluate the quality of internal housing conditions, including the presence of sanitary and technical installations and standards of use (Wooszyn et al., 2023). It has been discovered that characteristics of high-quality buildings have a direct impact on homeowners' happiness, underscoring the significance of taking building quality into account when developing low-income housing (Stachura, 2013).

Adequate housing is essential for mitigating health risks and enhancing climate resilience; however, many homes still struggle with issues like excessive heat, cold, and ventilation, which can result in mould and dampness (Aigbavboa and Thwala 2014). More efficient housing policies that take into account the triple win of health, equity, improved public health, climate resilience, and environmental sustainability are required in order to address the intricate relationships that exist between housing, health, and the larger environment (Sharpe et al., 2018). These policies should adopt systemic approaches.

The well-being and health of residents can be greatly impacted by substandard housing conditions, which include inadequate ventilation, cramped living quarters, and homes that are wet, mouldy, and cracked. The way people interact with their neighbours and take part in community events can be impacted by these circumstances. Research has indicated a strong correlation between housing circumstances and mental health consequences, such as stress and anxiety (Newton et al., 2022). Physical health problems, including respiratory disorders and general poor health, can also result from inadequate housing (Jackelyn and Bina 2023). Furthermore, children's behavioural and emotional development, physical health, and academic performance can all suffer from homelessness and unstable housing (Gaylord et al., 2018). To protect people's health and wellbeing and that of communities, it is imperative that these housing conditions be addressed.

The spread of infectious diseases like cholera, meningitis, TB, and chickenpox can be aggravated by overcrowded housing conditions (Akande et al., 2018). A study by Lorentzen et al. (2022) reported that lead, cadmium, microorganism distribution, dust mite and cockroach allergens, peeling paint, and mould are among the characteristics of crowded housing that have been linked to adverse health effects. Furthermore, negative health effects like stress, sleep disturbances, and infectious diseases have been connected to crowded households (Jackelyn and Bina 2023). Further, crowding has been positively associated with

COVID-19 case rates, independent of density, socioeconomic and racial composition in neighborhoods (Mehdipanah, 2023). Therefore, overcrowded housing conditions can indeed facilitate the transmission of infectious diseases and have negative health consequences (Capasso and D'Alessandro 2021).

Numerous contexts have examined housing-related issues, including mould, dampness, noise, air quality, and material issues. Research has indicated that there are serious shortcomings in the habitability of houses and the surrounding area, such as moisture problems, crumbling facades, and hygienic concerns. Studies have revealed that mould and moisture are relatively common in European housing stock; estimates indicating that one in six homes in Europe may have these issues (Agyekum et. al., 2017).

A study carried out in Chieti, Italy revealed that a considerable proportion of homes had problems with mould and moisture, in addition to having insufficient floor space and not meeting the minimum legal requirements (Haverinen-Shaughnessy, 2012). Additionally, research on the relationship between housing and sleep health has shown that, among older adults from disadvantaged backgrounds, exterior housing issues are associated with reduced overall sleep time, more wake time following sleep onset, and lower sleep efficiency (Capasso and Savino, 2012).

The housing shortage in Nigeria is severe, especially in metropolitan areas with rapidly expanding populations (Idonije et al., 2022). Informal settlements lack basic utilities and are characterized by poor construction, insufficient maintenance, air pollution which exacerbates the outbreak of infectious diseases and increase the health risk among occupants (Udoh, and Uyanga 2013). However, a number of studies have found a link between substandard housing and residents' wellbeing in Nigeria. Approximately 28% of Nigerians live in housing units without toilet facilities, whereas 16% of the population does so, according to the Nigerian Bureau of Statistics (NBS 2020) report on housing and household survey. Manisalidis et al., (2020) suggested that these factors have been associated to adverse health outcomes, such as an increased risk of infectious infections, respiratory troubles, and mental health problems. Awe et al., (2023), specified that residents of subpar housing in Nigeria have a lower quality of life than those who live in appropriate housing. According to the study, people who live in subpar housing units score lower on measures of their physical, emotional, and social well-being.

Alabi and Balogun (2021) stated that residents of substandard

housing in Nigeria were more likely to experience depression. According to the study, those who live in overcrowded and inadequately ventilated housing have a higher chance of developing depression than people who live in suitable housing. Based on the data on wellbeing in Nigeria related to housing circumstances, a poor living environment is linked to worse health outcomes and a reduced quality of life. For both people and communities, improving housing conditions can have major advantages. For instance, a study conducted in the US discovered that rehabilitating low-income housing with energy-efficient modifications improved health outcomes, such as decreased asthma symptoms, as well as reduced energy expenses for inhabitants (Breyse et al., 2017). Some of these dwelling issues that may have an impact on residents' wellbeing include indoor air quality, noise pollution, temperature extremes and housing quality.

Factors influencing adequate housing habitability

Income and affordability

Nigerians struggle to afford housing, leading to overpopulation, poor living conditions, and informal settlements, with 70% living on less than \$2 per day (Adedeji, et al., 2023).

Urbanization and population growth

Nigeria faces a housing shortage due to rapid urbanization and population growth, resulting in informal settlements and slums, unofficial settlements, and subpar housing in urban areas (Daniel et al., 2015; Akande, 2021).

Building materials and construction standards

Nigeria's subpar housing is due to inadequate materials, construction standards, and disregarded codes, resulting in unstable structures and collapsed structures. Factors include substandard workmanship, inadequate supervision, and subpar materials (Adedeji, et al., 2023).

Climate and environmental factors

The tropical climate in Nigeria can be hard on structures. The health of residents may be impacted by dampness and mould caused by poor drainage and ventilation systems. In some areas of the nation, flooding is a major issue that damages homes and forces evictions of citizens. Okon et al., (2021), stated that environmental degradation and climate change have a substantial impact on housing habitability in Nigeria.

RESEARCH METHODOLOGY

This study employed both qualitative and quantitative research methods. At its core, qualitative research asks open-ended questions like "how" and "why" that do not readily lend themselves to numerical replies. This type of study offers a deeper knowledge of experiences, phenomena, and context. Through qualitative research, it is possible to comprehend issues that are difficult to quantify, such as the human experience.

A comprehensive understanding of housing laws and housing needs planning in Bosso Minna was obtained through mixed-method research, which blends qualitative and quantitative research techniques. Both quantitative data and qualitative insights from focus groups and interviews were gathered, analysed, and interpreted with the help of mixed-method research. This method was used to evaluate the efficacy of current housing laws and pinpoint areas in need of development. In-depth insights into the experiences and viewpoints of people impacted by housing regulations were obtained through qualitative research techniques like site visits and interviews. Statistical information on housing trends and patterns were obtained through quantitative research techniques like census and GIS analysis. By integrating these methods, scholars can develop a comprehensive picture of Bosso Minna's housing predicament and offer well-informed suggestions for planning and policy.

Study Area

The study area Bosso estate is located in Minna the state capital of Niger state. Minna, the capital city of Niger State, in Nigeria's north central geopolitical zone. It is a large neighborhood that connects the cities of Abuja, Kano, Ibadan, and Lagos. It has a land size of 76,363 square kilometers. It is situated between the latitude and longitude values of 9.58 and 6.54 east of the Greenwich Meridian (see Figures 1 and 2). In Minna, there are 25 local government areas, one of which Bosso is one of the local government area that houses the study location "Bosso Estate" (Abd'Razack, 2012). The estate (Figure 3) is made up of 210 houses which comprises of 2 bedroom, 3 bedroom, and 4 bedroom apartments and the questionnaire distribution is 37%, 33% and 30% respectively. 36 houses were randomly selected for sampling based on the conditions of the houses.

Determining the population of the study location, NPC (2006) estimates that an average of 6 people live in a household which give the study population of 216. In research,

various approaches are employed to determine the sample. The sample size is determined by the study's need for reliable and authentic findings in order to establish final conclusions (Akande, et al. 2015). According to Bulmer and Warwick (1993), "the size of the sample is more a question of convenience," and a compromise among various criteria (expenses and precision, for example). The sample size for this study was determined using Krejcie and Morgan (1970) reference. The sample size for the questionnaire survey was 120 respondents.

The study area was chosen because of the neglected, dilapidated condition of the homes here. The residents are now experiencing health issues as a result. Bosso Estate in Minna has subpar housing conditions compared to adequate housing quality, which results in issues with mould, dampness, noise, poor air quality, and thermal comfort. Additionally, poor housing conditions at the study site were associated with the selection of building materials, the construction method, and the availability of adequate professional services. In addition, properties with the worst environmental and property characteristics such as overcrowding and tenant abuse are found in high-density neighbourhoods like Bosso Estate. Furthermore, the community's dissatisfaction stemmed from their performance and inadequate infrastructure. The poor quality of housing in the area is a result of these factors as well as rapid urbanisation of the area and the absence of suitable housing regulations.

The Questionnaire Survey

Survey research design which involves the administration of questionnaires to the target population was applied so as to extract necessary information for this study. A total of 140 questionnaires were distributed, with 120 returned, with a ratio of 60 male respondents to 60 females. While, data were collected from 120 respondents who live in the study area using close ended questionnaires that were made easy to understand. The collected data was analysed using Statistical Package for Social Sciences version 22 and the results presented using texts, tables and charts for easy comprehension. The Cronbach's alpha was used to establish the reliability and validity of the variable data in this study. Cronbach's alpha factor typically varies within 0 and 1. Significantly the data collected factored a coefficient of 0.71 with 5 items (Table 1) analysed. Acceptable according to Ruchi et al., (2014), this is acceptable asserting that there is actually no lower limit to the coefficient, the closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale.



Figure-1: Map of Nigeria Showing Niger State.



Figure-2: Map of Niger State Showing Niger Bosso.

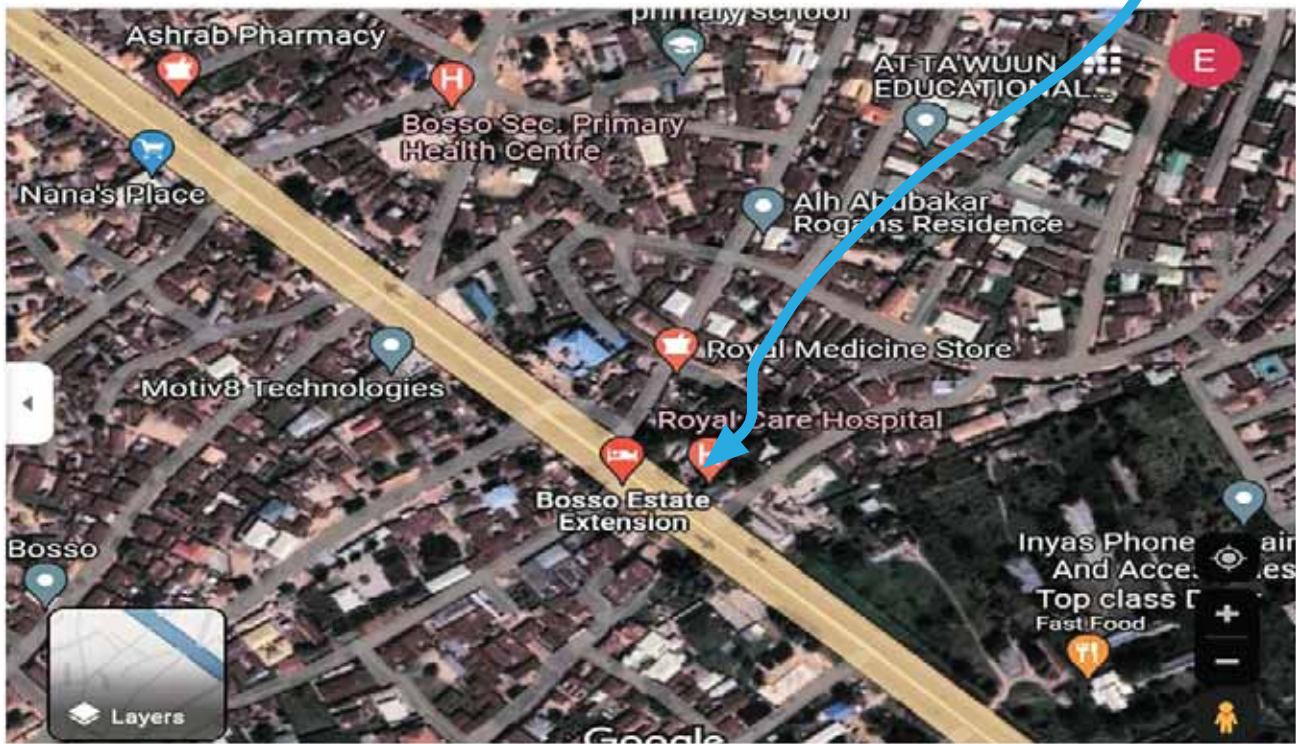


Figure-3: Google Map Showing Bosso Estate.

Data Presentation and Analysis

Quantitative data presentation involves arranging analyzed data that has been collected and interpreting the obtained findings or results. Statistical Package for Social Sciences (SPSS) version 22 was utilized to analyze the quantitative data. To display the results, tables and charts were utilized. An online questionnaire were administered through the use of Google form. A total of 120 responses were recieved.

This represented 100% response rate and considered adequate for the analysis carried out according to Moser et al., (1984).

RESULT AND DISCUSSION

Table 2 shows the age range of respondents in the study. As shown, there are 22 respondents (18-24 years), 34 respondents (25-30 years), 22 respondents (31-45years), 42 respondents

(46 and above). This implies that most of the respondents are 46 and above years followed by 25-30 years. This data is in support of Balloun et al. (2011) research where there is need for multiple respondents in survey research for sufficient supporting evidence.

As revealed, there are 60 male respondents (50%) and 60 female respondents (50%). This implies that both male and female gender has equal respondents in the study. The analysis also shows the educational background of the

respondents. The data shows that 40% of the respondents have bachelor degree, 15% had Master degree, 18.3% are HND holders, 5% are doctorate degree holders and 10% are ND holders while 8.3% have passed secondary school holders. This implies that the majority of the respondents are educated and the questionnaire will be well understood by the respondents. Table 3 present the findings on the effects of housing condition and its impact on building occupants. It can be seen that the respondents agreed on two of the six questions, with mean value of approximately 3. The result implies that the listed items affects the resident's wellbeing and health condition.

Similar result is demonstrated in Figure 4 which shows the outcome of the survey conducted to gather respondents' views on poor housing habitability and its impact on wellbeing and health. The findings obtained agrees with those of Owoeye, and Omole (2012) study that poor housing conditions and insufficient household services contribute 52.3% to environmental quality, air pollution, and infectious diseases.

Table-1: Reliability Test.

Section	Cases	Reliability	Interpretation
Section2	4	0.544	Moderately reliabe
Section3	5	0.606	Strongly reliable
Section4	6	0.677	Strongly reliable
Section5	10	0.699	Strongly reliable
Section6	6	0.718	Strongly reliable
Overall	33	0.659	Strongly reliable

Table-2: Demographics of Respondents.

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Age			Employment Status		
18-24	22	18.3	Employed full-time	37	30.8
25-30	34	28.3	Employed part-time	12	10
31-45	22	18.3	Self-employed	41	34.2
46 and above	42	35	Unemployed	12	10
Gender			Retired	6	5
Male	60	50	Student	12	10
Female	60	50	Monthly Income		
Marital Status			Less than N50,000	42	35
Single	85	54.2	N50,00-N100,000	20	16.7
Married	53	44.2	N100,000-200,000	29	24.2
Divorced	2	1.7	N200,000-500,000	14	11.7
Educational Background			N500,000 and above	15	12.5
Secondry School	10	8.3	Housing Type		
HND	22	18.3	Self-contained apartment	17	14.2
ND	12	10	Room in a share apartment	7	5.8
Bachelor Degree	48	40	One bedroom apartment	9	7.5
Master Degree	18	15	Two bedroom apartment	44	36.7
Doctoral Degree	6	5	Three bedroom apartment	37	30.8
Other	4	3	Other	6	5
			How Many People are Living in Your Household		
			1-5	67	55.8
			6-10	37	30.8
			10 and above	16	13.3

The effects of housing condition on the occupants physical, mental and social well-being is presented in Table 4. From the result, over 2.50 mean value obtained indicates a positive relationship between them. This implies there is a strong relationship between variables or datasets presented. These findings are generally in agreement with study Cowie et al., (2015); Lorentzen et al., (2022) which examine the associations between the built environment and mental health and found strong relationship among the presented data.

The analysis also shows that 48.3% of the respondents occasionally experience temperature fluctuation, 39.2% frequently experience temperature fluctuation, and 8.3% always experience it while 4.2% never experience temperature fluctuation in their residence with a mean value of 2.51. This implies that the respondents frequently experience temperature fluctuation in housing. This can result in poor air quality which leads to increased respiratory infections and coughing. Cowie et al. (2015) found that air pollution

Table-3: Effects of Housing Condition and its Impact on Users.

Variable	Frequency (percentage)	Mean Value
How would you rate the overall condition of your current housing		2.34
Excellent	22(18.3)	
Good	48(38.3)	
Fair	41(34.2)	
Poor	11(9.2)	
How often do you experience cracked wall, dampness, mold or mildew in your house		2.81
Never	7(5.8)	
Rarely	25(20.8)	
Sometimes	71(59.2)	
Frequently	17(14.2)	
How Satisfied are you with the natural light in your house		2.51
Not at all satisfied	17(14.2)	
Slightly satisfied	46(38.3)	
Moderately satisfied	36(30)	
Very satisfied	21(17.5)	
How satisfied are you with the ventilation and air quality in your home		3.02
Not at all satisfied	2(1.7)	
Slightly satisfied	30(25)	
Moderately satisfied	52(43.3)	
Very satisfied	36(30)	
How satisfied are you with the assess tobasic amenities such as clean water and sanitation in your home		2.21
Not at all satisfied	32(26.7)	
Slightly satisfied	51(42.5)	
Moderately satisfied	17(14.2)	
Very satisfied	20(16.7)	
How satisfied are you with the level of noise pollution or disturbances from outside your home		2.95
Not at all satisfied	8(6.7)	
Slightly satisfied	28(23.3)	
Moderately satisfied	46(38.3)	
Very satisfied	38(31.7)	

causes harmful health outcomes, including increased mortality rates from heart attacks, strokes, lung cancer, chronic non-cancer lung disease, asthma attacks, and respiratory problems. Short-term exposure to PM and ozone also contribute to these issues.

A survey found that noisy housing conditions negatively impact occupants' mental well-being, with 49.2% of the respondents occasionally experiencing noise disturbance from their neighbourhood, 15.8% frequently experience noise disturbance, 3.3% always experience noise disturbance while 31.7% never experience noise disturbance with a mean value of 1.91 which implies that the respondents experience noise disturbance from their neighbourhood. This aligns with Akande et al., (2022) findings, which suggest high noise annoyance is linked to impaired mental health. The study suggests improved environmental quality in the built environment and synergistic interventions from architects, professionals, and environmental protection agencies to address urban environmental noise pollution in residential environments. Housing conditions that are noisy can have detrimental effects on mental health, such as contributing to anxiety and depression (Riva et al., 2022). Respiratory

issues, infections, allergies, and asthma can result from damp or mouldy living conditions (Torresin et al., 2022; Agyekum et al., (2017).

In order to identify the factors that influence the quality of housing that result in poor building habitability, Relative Important Index (RII) was used. The Relative Important Index formula is given as:

$$RII = \frac{\sum W}{A * N}$$

Where W= Weight given to each statement by the respondent
 A=Highest response integer which is 4
 N=Total number of respondent for users=120

Findings as shown in Table 5 present the factors that influence the quality of housing resulting in poor building habitability. As can be seen, cultural and traditional beliefs and practices were ranked first as the factors that influence quality of housing and poor building habitability. Corruption and inefficiency in the housing sector, natural disasters and climate change, poverty were ranked 2nd, 3rd and 4th factors

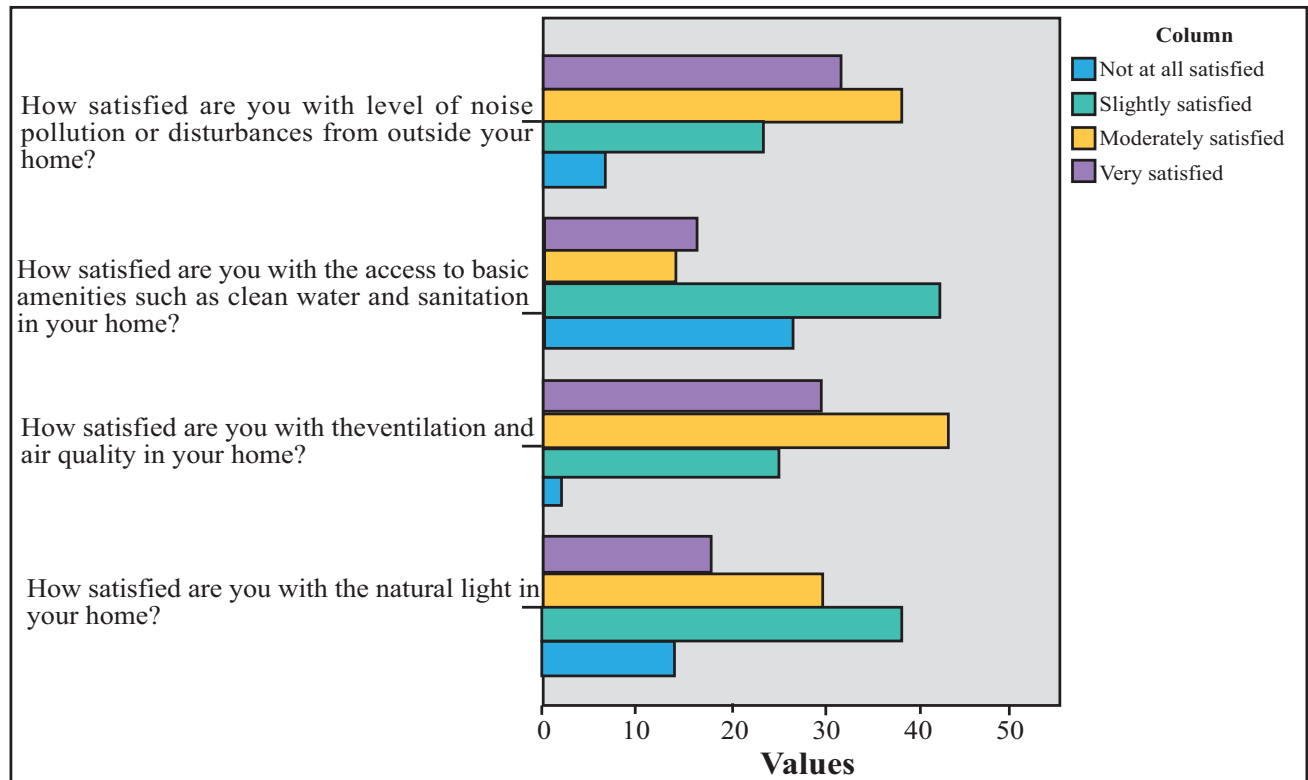


Figure-4: Effects of housing condition and its impact on users.

Table-4: Effects of Housing Condition on Physical, Mental and Social Well-Being.

Variable	Frequency (percentage)	Mean Value
How does the condition of your living space affect your ability to relax and unwind		2.50
Positively	29(24.2)	
Negatively	22(18.3)	
No effect	49(40.8)	
Don't know	20(16.7)	
How often do you feel stressed or anxious because of the condition of your living space		2.1
Never	30(25)	
Occasionally	50(41.7)	
Frequently	38(31.7)	
Always	2(1.7)	
How often do you experience noise disturbance from your neighbour		1.91
Never	38(31.7)	
Occasionally	59(49.2)	
Frequently	19(15.8)	
Always	4(3.3)	
How does the noise level affect your daily life and well-being		1.74
Not at all	47(39.2)	
Slightly	57(47.5)	
Moderately	16(13.3)	
Significantly	0	
How often do you experience temperature fluctuation in your housing?		2.51
Never	5(4.2)	
Occasionally	58(48.3)	
Frequently	47(39.2)	
Always	10(8.3)	
How does temperature fluctuation affectr your daily life and well-being		2.4
Never	14(11.7)	
Occasionally	56(46.7)	
Frequently	38(31.7)	
Always	12(10)	
How often do you experience physical injuries or accidents in your home due to poor lighting, cracked floors or other damages in the house		1.95
Not at all	44(36.7)	
Slightly	42(35)	
Moderately	29(24.2)	
Significantly	5(4.2)	

that influence housing condition while government policies and regulations, lack of access to finance, lack of maintenance and repair of housing, power shortage were ranked 7th, 8th, 9th and 10th.

Table 6 shows the strategies for improving housing conditions. From the analysis, six factors were suggested as ways to improve the condition of housing in the case area location. Upgrading existing houses has a mean value of 1.47, building new affordable housing has a mean value of 1.7, subsidising tax for first-time house buyers has a mean value of 1.9, enforcing building codes and regulations has a mean value of 1.8, improving personal hygiene has a mean value of 1.79, proper maintenance and repair of housing has a mean value of 1.55. This finding is in agreement with Tilburg (2017), who stated that strategies for improving housing conditions and minimising health risks include legal and policy interventions, housing improvement, economic crises, creation of a social housing stock, and behavioural factors. Legal and policy interventions can assist communities in addressing the adverse impacts of poor housing conditions

and improving the health and safety of residents, especially vulnerable populations.

To examine if there is any relationship between housing conditions and the well-being of occupant in residential dwelling, a test of correlations between housing conditions on the well-being of occupant was carried out. This is to determine if there was any or no significant relationship between housing conditions on the well-being of occupant in residential dwelling. According to the findings from Table 7, there is a significant relationship between housing condition and its effect on well-being. The correlation coefficient of -0.360 and a p-value of 0.000 which is less than 0.05 obtained implies a negative relationship between the housing condition and well-being i.e. as the housing condition moves from not satisfied to satisfied by the respondents, its effect on physical, mental and social well-being reduces.

The individual relationship (one to one) relationship is presented in Table 8. From the Table, result shows there is a significant relationship between how often the respondent

Table-5: Factors that influence the quality of housing that result to poor building habitability.

Factors Influencing Housing Condition	SA	A	SD	D	ΣW	RII	Rank
Government policies and regulations	45 (37.5)	53 (44.2)	6 (5)	16 (13.3)	233	0.485	7
Poverty	39 (32.5)	45 (37.5)	13 (10.8)	23 (19.2)	260	0.542	4
Lack of access to finance	37 (30.8)	66 (55)	10 (8.3)	7 (5.8)	227	0.473	8
Poor urban planning and management	32 (26.7)	66 (55)	6 (5)	16 (13.3)	246	0.513	5
Rapid population growth	42 (35)	53 (44.2)	7 (5.8)	18 (15)	241	0.502	6
Corruption and inefficiency in the housing secotr	33 (27.5)	35 (29.2)	10 (8.3)	42 (35)	301	0.627	2
Cultural and Traditional Beliefsand Practices	13 (10.8)	45 (37.5)	31 (25.8)	30 (36.8)	308	0.642	1
Natural disasters and climate change	24 (20)	67 (55.8)	13 (10.8)	16 (13.3)	261	0.544	3
Lack of maintenance and repair of housing	36 (30)	69 (57.5)	12 (10)	3 (2.5)	222	0.463	9
Power shortage	55 (45.8)	48 (40)	4 (3.3)	2 (1.7)	217	0.452	10

experience cracked walls, dampness, mold or mildew in their homes and how often they feel stressed or anxious because of the condition of their living spaces, with a coefficient of 0.181 and a p-value of 0.048 which is less than 0.05. This implies that as their experience of cracked wall, dampness, mold or mildew in their homes increases the property's they became more stressed or anxious about the condition.

A significant and positive relationship was found between cracked walls, dampness, mold or mildew and how noise level affects occupants daily life and well-being. Such a relationship was also found between cracked walls, dampness, mold or mildew and the experience of temperature fluctuations in housing. This implies that the frequency of temperature swings in the house is connected to issues like cracked walls, moisture, mould, or mildew. High relative humidity and precipitation are linked to self-reported home mould, wet spots, and water damage.

A negative relationship between satisfaction with natural light and how the condition of their living spaces affect their ability to relax and unwind with a coefficient of -0.220 and a p-value of 0.016 which is less than 0.05. This implies that

as their satisfaction level increases from not satisfied to satisfied, the condition of their living spaces affecting their ability to relax and unwind reduces.

A significant and negative relationship was found also between how satisfied the respondents are with natural light in their home and how the respondent feel stressed or anxious because of the condition of their living spaces with a coefficient of -0.378 and a p-value of 0.00 which is less than 0.05. This implies that as their satisfaction level increases from not satisfied to satisfied, the stressed and anxiety of the condition of their living reduces. Lastly there is a significantly negative relationship between how satisfied the respondents are with natural light in home and how often they experience temperature fluctuation with a coefficient of -0.233 and a p-value of 0.010 which is less than 0.05. This implies that as their satisfaction level increases from not satisfied to satisfied, their experience of temperature fluctuation in the homes reduces. A negative relationship was found between how satisfied the respondents are with the ventilation and air quality in their home and how the respondents felt stressed or anxious because of the condition of their living spaces. This produced a coefficient of -0.341 and a p-value of 0.00 which is less than 0.05. This implies

Table-6: Strategies for Improving Housing Conditions and Minimize Health.

Strategies for Improving Housing Condition	SA	A	SD	D	Mean Value	Decision
Upgrading existing houses	67 (55.8)	51 (42.5)	0	2 (1.7)	1.47	A
Building new affordable housing	38 (31.7)	76 (63.3)	6 (5)	0	1.7	A
Subsidizing tax for first time house buyers	50 (41.7)	45 (37.5)	10 (8.3)	15 (12.5)	1.9	A
Enforcing building codes and regulations	41 (34.2)	66 (55)	8 (6.7)	4.2	1.8	A
Improving personal hygiene	48 (40)	54 (45)	12 (10.8)	5 (4.2)	1.79	A
Proper maintenance and repair of housing	64 (53.3)	51 (42.5)	0	5 (4.2)	1.55	A

Table-7: Correlations Between Housing Conditions on the Well-Being of Occupant.

		Housing Condition	Effect on Well Being
Spearman's rho	Housing Condition	Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
		N	120

that as their satisfaction level increases from not satisfied to satisfied, the stressed and anxiety of the condition of their living reduces.

Further there is a significantly negative relationship between satisfaction are with ventilation and air quality in of home and the experience temperature fluctuation in their homes with a coefficient of -0.432 and a p-value of 0.00 which is less than 0.05. This implies that as their satisfaction level increases from not satisfied to satisfied, their experience of temperature fluctuation in the homes reduces. There is a negative relationship between satisfaction with ventilation and air quality in home and experience of noise disturbances from the neighbourhood, and the effect of noise level on daily life and well-being with a coefficient of -0.186 and -0.207 and a p-value of 0.042 and 0.023 respectively. This implies that as their satisfaction level of ventilation and air quality increases from not satisfied to satisfied, their experience of noise disturbance and its affect on their well-being reduces.

There was a negative relationship between respondents satisfaction with the access to basic amenities such as clean water and sanitation and now temperature fluctuation affect

their daily life and well-being in homes with a coefficient of -0.182 and a p-value of 0.049 which is less than 0.05. This implies that as their satisfaction with the access to basic amenities level increases from not satisfied to satisfied, their effect of temperature fluctuation on their daily life and well-being reduces. There is a negative relationship between satisfaction with access to basic amenities such as clean water and sanitation and how they experience physical injuries or accidents in their home due to poor lighting, cracked floor or other damages and the noise level affect their daily life and well-being with a coefficient of -0.198 and -0.388 and a p-value of 0.030 and 0.00 respectively. This implies that as their satisfaction level of access to basic amenities such as clean water and sanitation increases from not satisfied to satisfied, their experience of physical injuries or accidents in home due to poor lighting, cracked floor or other damages and the noise level affect on their daily life and well-being reduces.

A negative significant relationship was found between satisfaction of respondents with the level of noise pollution or disturbances outside their home and condition of their living spaces affecting their ability to relax and unwind in their homes with a coefficient of -0.266 and a p-value of

Table-8: Relationship Between Housing Condition and Well-Being.

			How does the condition of your living space affect your ability to relax and unwind?	How often do you feel stressed or anxious because of the condition of your living space?	How often do you experience noise disturbances from your neighbours?	How does the noise level affect your daily life and well-being?	How often do you experience temperature fluctuations in your housing (too hot or too cold)?	How does temperature flusctuations affect your daily life and well-being?	How often do you experience physical injuries or accidents in your home due to poor lighting, cracked floors or other damages in the house?
Spearman's rho	How often do you experience cracked walls, damages, mold or mildew in your home?	Correlation Coefficient Sig. (2-tailed)	-.99 .283	.181* .048	.160 .081	.271** .003	.359** .000	.370** .000	.305** .001
	How satisfied are you with the natural light in your home?	Correlation Coefficient Sig. (2-tailed)	-.220* .016	-.378** .000	.081 .378	.056 .544	.233* .010	.055 .550	-.137 .135
	How satisfied are you with the ventilation and air quality in your home?	Correlation Coefficient Sig. (2-tailed)	-.075 .415	-.341** .000	-.186* .042	-.207* .023	-.432** .000	.053 .567	-.270** .003
	How satisfied are you with the access to basic amenities such as clean water and sanitation in your home?	Correlation Coefficient Sig. (2-tailed)	.031 .735	-.071 .438	-.125 .174	-.388** .000	.150 .103	-.180* .049	-.198* .030
	How satisfied are you with the level of noise pollution or disturbances from outside your home?	Correlation Coefficient Sig. (2-tailed) N	-.260** .004 120	-.189* .038 120	-.203* .026 120	-.424** .000 120	-.053 .565 120	-.174 .058 120	.126 .169 120

0.004 which is less than 0.05. This implies that as their satisfaction with the level of noise pollution or disturbances from outside their home increases from not satisfied to satisfied, their condition of living spaces affecting their ability to relax and unwind in homes reduces. There is negative and significant relationship between satisfaction of respondents with the level of noise pollution or disturbances from outside and how often they feel stressed or anxious because of the condition of their living spaces, how often they experience noise disturbances from their neighbourhood, and how noise level affect their daily life and well-being in their homes with a coefficient of -0.189, -0.203, and -0.424 and a p-value of 0.038, 0.026, and 0.000 respectively. This implies that as their satisfaction level of noise pollution or disturbances from outside their home increases from not satisfied to satisfied, their experience how often they feel stressed or anxious because of the condition of their living spaces, how often they experience noise disturbances from neighbourhood, and how the noise level affect their daily life and well-being in their homes reduces.

CONCLUSION AND RECOMMENDATION

The research examines building habitability towards the outbreak of infectious diseases with a specific focus on minimising health risk for adequate physical, mental, and social well-being of the occupants in residential housing. Based on the study, the habitability of residential housing in the study location is poor, which promotes conditions like inadequate ventilation, dampness, and overcrowding lead to various health problems such as respiratory illnesses like allergies and psychological distress. Therefore, it is recommended that the government, housing developers, and stakeholders in the housing sector take measures to ensure that housing are designed and constructed to meet basic standards of health and safety. This can be achieved through the enforcement of building codes, policies and regulations, provision of adequate infrastructure and services, and promotion of sustainable and affordable housing initiatives. Additionally, there is a need for increased awareness and education on the importance of good housing conditions and their impact on the well-being of occupants. This can be done through public campaigns, community engagement, and provision of information to prospective tenants and homeowners.

REFERENCES

- Abd'Razack, N. 2012. An Appraisal of Household Domestic Energy Consumption in Minna, Nigeria. IOSR, *Journal of Environmental Science, Toxicology and Food Technology*. 2. 16-24. 10.9790/2402-0231624.
- Adedeji, I., Deveci, G., Salman, H. 2023. The Challenges in Providing Affordable Housing in Nigeria and the Adequate Sustainable Approaches for Addressing Them. *Open Journal of Applied Sciences*. 13. 431-448. 10.4236/ojapps.2023.133035.
- Agyekum, K., Salgin, B., Kwame, D. 2017. Creating awareness on the negative impact of dampness on the health of occupants: A case for inhabitants living in damp buildings in Ghana in: *International Journal of Development and Sustainability*, 6(8) pp 1-18..
- Aigbavboa, C., Thwala, W. 2014. Structural equation modelling of building quality constructs as a predictor of satisfaction in subsidised low-income housing. *Urbani izziv*. 25. S134-S147. 10.5379/urbani-izziv-en-2014-25-supplement-010.
- Akande, O K., Yusuf, A., Sham, R. 2023. Effects of Indoor Environmental Quality in Urban Housing on Residents' Health and Wellbeing in Nigeria. *Environment-Behaviour Proceedings Journal*. 8. 157-165. 10.21834/ebpj.v8i23.4505.
- Akande, O. K., Olagunju, R.E., Aremu, S.C., Ogundepo, E. 2018. Exploring Factors Influencing of Project Management Success in Public Building Projects in Nigeria. *YBL Journal of Built Environment*. 6. 47-62. 10.2478/jbe-2018-0004.
- Akande, O.K. 2010. Passive Design Strategies for Residential Buildings in Hot-Dry Climate in Nigeria. In: *Eco- Architecture III: Harmonization between Architecture and Nature. Ecology and the Environment* Volume 128. Pp 61 - 71 WIT Press, UK.
- Akande, O. K & Fabiyi, O & Mark, I. 2015. Sustainable Approach to Developing Energy Efficient Buildings for Resilient Future of the Built Environment in Nigeria. *American Journal of Civil Engineering and Architecture* 3,4, 144-152. 3. 144-152. 10.12691/ajcea-3-4-5.
- Akande, O.K. 2021. Urbanization, Housing Quality and Health: Towards a Redirection in Housing Provision in Nigeria. *Journal of Contemporary Urban Affairs*. Volume 5 Number 1, pages 35– 46
- Akande, O.K., Adenle, A.A., Emechebe, L.C., Lembi, J.J., Ahmed, S., Eze, C.J., Ajayi, M. R. 2022. "Implications of Residential Housing Exposure to Urban Environmental Noise on Resident's Wellbeing in Minna, Nigeria", *Khulna Univ. Stud.*, Pp. 154–166, Dec. 2022.
- Alabi, M., & Balogun, F. 2021. Housing and Mental Health in Informal Settlements: A Case of Ibadan North Local Government Area of Oyo State, Nigeria. in: *African Journal for Psychological Studies of Social Issues*, 24. 123-135.
- Anaemene, B. 2017. Health and Diseases in Africa. *The Development of Africa*. 2017 Oct 27;71:207–26. doi: 10.1007/978-3-319-66242-8_12. PMID: PMC7122698.
- Asa, A., Adekunle, O., Morakinyo, K., Opeyemi, & Musediq, O., Lawal, M., 2017. An Assessment of Housing Conditions, Characteristics and Neighborhood Quality in Ile -Ife, Osun State, Nigeria. 8. 86-104.
- Awada, M., Becerik-Gerber, B., Hoque, S., & O'Neill, Z., Pedrielli, G., Wen, J., Wu, T. 2020. Ten questions concerning occupant health in buildings during normal operations and extreme events including the COVID-19 pandemic. *Building and Environment*. 188. 107480. 10.1016/j.buildenv.2020.107480.
- Awe, F., Adeboye, A., Akinluyi, M., Okeke, F., Yakubu, S., Awe, F. 2023. Assessment of the relationship between housing quality and income in urbanizing city of Ado-Ekiti, Nigeria. *World Journal of Advanced Research and Reviews*. 18. 969-978. 10.30574/wjarr.2023.18.2.0941.
- Balloun, J., Barrett, H., Weinstein, A. 2011. One is not enough: The Need for Multiple Respondents in Survey Research of Organizations. *Journal of Modern Applied Statistical Methods*. 10. 287-296. 10.22237/jmasm/1304223900.
- Bulmer, M., & Warwick DP, eds. 1993. *Social Research in Developing Countries: Surveys and Censuses in the Third World*. London: UCL Press.
- Breyse, J., Jacobs, D.E., Weber, W., Dixon, S., Kawecky, C., Aceti, S., Lopez, J. 2017. Health outcomes and green renovation

of affordable housing. *Public Health Rep.* 126 (1):64-75. doi: 10.1177/00333549111260S110.

Capasso, L and Savino A. 2012. Assessment of the hygienic and sanitary conditions of housing in a sample in Chieti (central Italy)]. *Ann Ig.* 24(1):41-6. Italian. PMID: 22670336.

Capasso, L., D'Alessandro D. 2021. Housing and Health: Here We Go Again. *Int J Environ Res Public Health.* Nov 17;18(22):12060. doi: 10.3390/ijerph182212060. PMID: 34831815; PMCID: PMC8624624.

Chen, Y.; Qin, X. 2022. The Impact of Extreme Temperature Shocks on the Health Status of the Elderly in China. *Int. J. Environ. Res. Public Health* 2022, 19, 15729.

Cowie, H., Crawford, J., Davis, A., Steinle, S., Reis, S., Dixon, K., Morris, G., Hurley, F. 2015. Air Quality, Health, Wellbeing and Behaviour. *IOM Working for a healthier future.*

Daniel, M., Wapwera, S., Akande, E., Choji, C., Aliyu, A. 2015. Slum Housing Conditions and Eradication Practices in Some Selected Nigerian Cities. *Journal of Sustainable Development.* 8. 230-241. 10.5539/jsd.v8n2p230.

Ferguson, L., Taylor, J., Davies, M., Shrubsole, C., Symonds, P., Dimitroulopoulou, S. 2020. Exposure to indoor air pollution across socio-economic groups in high-income countries: A scoping review of the literature and a modelling methodology. *Environ Int.* 143:105748. doi: 10.1016/j.envint.2020.105748.

Fakunle, A., Ogundare, J., Olayinka-Alli, L., Ogunronbi, M., & Bello, T., & Elujulo, O., & Olamide, O., & Saliu, I. 2018. Housing Quality and Risk Factors Associated with Respiratory Health Conditions in Nigeria. 10.5772/intechopen.78543.

Gaylord, A.L., Cowell, W.J., Hoepner, L.A., Perera, F.P., Rauh, V.A, Herbstman, J.B. 2018. Impact of housing instability on child behavior at age 7. *Int J Child Health Hum Dev.*; 10(3):287-295. PMID: 34531938; PMCID: PMC8442946.

Glaubergerman, G. 2020. Scoping review of fire safety behaviors among high-rise occupants: Implications for public health nursing. *Public Health Nursing.* 37. 10.1111/phn.12728.

Hablemitođlu, P., Ozkan, Y., Purutçuoğlu, E. 2010. The assessment of the housing in the theory of Maslow's hierarchy of needs. *European Journal of Social Sciences,* 16. 222-228.

Haverinen-Shaughnessy U. 2012. Prevalence of dampness and mold in European housing stock. *J Expo Sci Environ Epidemiol.* 22(5):461-7. doi: 10.1038/jes.

Holden, K. A, Lee, A. R, Hawcutt, D. B, Sinha, I. P. 2023. The impact of poor housing and indoor air quality on respiratory health in children. *Breathe (Sheff).* 2023 doi: 10.1183/20734735.0058-2023.

Howden-Chapman, P., Bennett, J., Edwards, R., Jacobs, D., Nathan, K., Ormandy, D. 2022. Review of the Impact of Housing Quality on Inequalities in Health and Well-Being. *Annu Rev Public Health.* 2023 3;44:233-254. doi: 10.1146/annurev-publhealth-071521-111836.

Howden-Chapman, P. L., Chandola, T., Stafford, M. 2011. The effect of housing on the mental health of older people: the impact of lifetime housing history in Whitehall II. *BMC Public Health* 11, 682 (2011).

Idonije, A. D., Idris, A., Haruna, M. J., Umar, K. H. 2022. Effect of Housing Deficit on National Development: The Nigerian Perspective. *Zamfra Journal of Politics and Development,* 3(1), pp. 11-11.

Isah, O. S. and Nuhu, A. A., and Suleiman, I. M. 2023 Enhancing Security in Residential Building through Architectural Approach: Improving Building Occupants' Safety through Additional Security Measures. *British Journal of Environmental Sciences,* 11 (2). pp. 12-22.

Jackelyn H., Bina, P. S. 2023. Shared and Crowded Housing in the Bay Area: Where Gentrification and the Housing Crisis Meet COVID-19, *Housing Policy Debate,* 33:1, 164-193, DOI:

Krieger J., Higgins D. L. 2002. Housing and health: time again for public health action. *American Journal of Public Health.* 92(5):758-68. doi: 10.2105/ajph.92.5.758. PMID: 11988443; PMCID: PMC1447157.

Kumar, P., Kumar, P., Garg, R., Garg, R. 2021. Urban housing: a study on housing environment, residents' satisfaction and happiness. *Open House International*. 46. 528-547. 10.1108/OHI-12-2020-0179.

Krejcie, R. V., & Morgan, D. W. 1970. Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.

Lorentzen, J.C., Johanson, G., Björk, F., Stensson, S. 2022. Overcrowding and Hazardous Dwelling Condition Characteristics: A Systematic Search and Scoping Review of Relevance for Health. *Int. J. Environ. Res. Public Health* 19, 15542. <https://doi.org/10.3390/ijerph192315542>

Manisalidis, I, Stavropoulou, E, Stavropoulos, A., & Bezirtzoglou, E. 2020. Environmental and Health Impacts of Air Pollution: A Review. *Front. Public Health* 8:14. doi: 10.3389/fpubh.2020.00014.

Mehdipanah, R. 2023. Without Affordable, Accessible, and Adequate Housing, Health Has No Foundation. *Milbank Q; 101(S1):419-443*. doi: 10.1111/1468-0009.12626.

Mewomo, M., Toyin, J., Iyiola, C., Aluko, O. 2021. The Impact of Indoor Environmental Quality on Building Occupants Productivity and Human Health: A Literature Review. *Building smart resilient and sustainable infrastructure in developing countries. limingstone, Zambia*.

Moser, K.A., Fox, A.J., Jones, D.R. 1984. Unemployment and mortality in the OPCS Longitudinal Study. *Lancet*. 8;2(8415):1324-9. DOI: 10.1016/s0140-6736(84)90832-8.

Mucci, N., Traversini, V., Lorini, C., De Sio, S., Galea, R.P., Bonaccorsi, G., Arcangeli, G. 2020. Urban Noise and Psychological Distress: A Systematic Review. *Int J Environ Res Public Health*. 11; 17(18):6621. doi: 10.3390/ijerph17186621.

Newton, D., Lucock, M., Armitage, R., Monchuk, L., Brown P. 2022. Understanding the mental health impacts of poor quality private-rented housing during the UK's first COVID-19 lockdown. *Health Place; 78:102898*. doi: 10.1016/j.healthplace.2022.102898.

Nigerian Bureau of Statistics. 2020. Housing and household survey.

Novak, N. L., Geronimus, A. T., & Martinez-Cardoso, A. M. 2019. Change in birth outcomes among infants born to Latina mothers after a major immigration raid. *International journal of epidemiology*, 48(3), 839-849.

NPC, 2006. National Population Commission, Population and Housing Census of the Federal Republic of Nigeria, Published official *Gazette of the Federal Republic of Nigeria* 2(96)

Odoyi, E. J., Riekkinen, K. 2022. Housing Policy: An Analysis of Public Housing Policy Strategies for Low-Income Earners in Nigeria. *Sustainability* 14, 2258. .

Okon, E. M., Falana, B. M., Solaja, S.O., Yakubu, S.O., Alabi, O.O., Okikiola, B.T., Awe, T.E., Adesina, B.T., Tokula, B.E., Kipchumba, A.K., Edeme, A.B. 2021. Systematic review of climate change impact research in Nigeria: implication for sustainable development, *Heliyon*, Volume 7, Issue 9, .

Olukolajo, M. A., Adewusi, A.O. & Ogungbenro, M.T. 2013. "Influence of Housing Condition on the Health Status of Residents of Urban Core of Akure, Nigeria", *International. Journal of Development and Sustainability*, Vol. 2 No. 2, pp. 1567-1579.

O'Sullivan, K., Olin, C., Pierse, N., Howden-Chapman, P. 2023. Housing: the key infrastructure to achieving health and wellbeing in urban environments. *Oxford Open Infrastructure and Health*. 1. 10.1093/ooih/ouad001.

Owoeye, J., & Omole, K. 2012. Analysis of Housing Condition and Neighborhood Quality of Residential Core of Akure, Nigeria. *Mediterranean Journal of Social Sciences*. 3. 471-481.

Palacios, J., Eichholtz, P., Kok, N., Aydin, E. 2020. The impact of housing conditions on health outcomes. *Real Estate Economics*. 49. 10.1111/1540-6229.12317. . DOI:

Pevalin, D., Reeves, A., Baker, E., Bentley, R. 2017. The impact of persistent poor housing conditions on mental health: A longitudinal population-based study. *Preventive Medicine*. 105. 10.1016/j.ypmed.2017.09.020.

Riva, A., Rebecchi, A., Capolongo, S., Gola, M. 2022. Can Homes Affect Well-Being? A Scoping Review among Housing Conditions, Indoor Environmental Quality, and Mental Health Outcomes. *Int J Environ Res Public Health*. Nov 30; 19(23):15975. doi: 10.3390/ijerph192315975

Rolfé, S., Garnham, L., Godwin, J. 2020. Housing as a social determinant of health and wellbeing: developing an empirically-informed realist theoretical framework. *BMC Public Health* **20**, 1138 (2020). .

Ruchi B., Jihye K., Joyce E. 2014. Many Candidate Surveys on Program Evaluation: Examining Instrument Reliability, Validity and Program Effectiveness. *American Journal of Educational Research*. 2(8):683-690. doi: 10.12691/education-2-8-18.

Sano, Y., Mammen, S., Houghten, M. 2021. Well-Being and Stability among Low-income Families: A 10-Year Review of Research. *J Fam Econ Issues*. 42(Suppl 1):107-117.

Sauni, R., Verbeek, J. H., Uitti, J., Jauhiainen, M., Kreiss, K., Sigsgaard, T. 2015. Remediating buildings damaged by dampness and mould for preventing or reducing respiratory tract symptoms, infections and asthma. *Cochrane Database Syst Rev*. 25 (2):CD007897. doi:Ê.

Sharpe, R. A., Taylor, T., Fleming, L .E., Morrissey, K., Morris, G., Wigglesworth, R. 2018. Making the Case for "Whole System" Approaches: Integrating Public Health and Housing. *Int J Environ Res Public Health*. 24; 15(11):2345. doi: 10.3390/ijerph15112345.

Stachura, E. 2013. "A Study in Polish Housing Conditions. Methodology and Building Typology Characteristics" *Real Estate Management and Valuation*, vol.21, no.1, 2013, pp.25-31. .

Tilburg, W. C. 2017. Policy Approaches to Improving Housing and Health. *J Law Med Ethics*. 45(1:90-93. doi: 10.1177/1073110517703334.

Torresin, S., Ratcliffe, E., Aletta, F., Albatici, R., Babich, F., Oberman, T., Kang, J. 2022. The actual and ideal indoor soundscape for work, relaxation, physical and sexual activity at home: A case study during the COVID-19 lockdown in London. *Front. Psychol*. 13:1038303. doi: 10.3389/fpsyg.2022.1038303.

Udoh, U. and Uyanga, J. 2013. Housing Conditions and Health in Rural Nigeria: A Case Study Of Akwa Ibom State. *Res Humanit Soci*. 3. 34-41.

Wargoeki, P & Wyon, D. 2016. Ten questions concerning thermal and indoor air quality effects on the performance of office work and schoolwork. *Building and Environment*. 112. 10.1016/j.buildenv.2016.11.020.

WHO 2009, Global Health Risks - World Health Organization. info/.../Global Health Risks_ report_full.pdf.

Wooszyn, R., Wooszyn, A., Stanisawska, J. 2023. Quality of housing conditions in rural areas in Poland at voivodeship level. *Annals of the Polish Association of Agricultural and Agribusiness Economists*. XXV. 10.5604/01.3001.0053.6817.