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Assessment model of the symmetrical relationship between housing quality and health in an urbanizing environment

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Abstract---Good health is the desire of all humans but it is not readily available and housing is a factor in achieving good health, however quality housing is equally not readily available. The study investigated the relationship between the state of housing components, housing quality and people' health in Ado- Ekiti as an urbanizing city in Nigeria. The research used a rigorous random selection approach to ensure that the whole study region was covered, and 1500 questionnaires were sent to homeowners. For the empirical estimate of the parameters, the research used double-log multiple linear regression. There is no pair-wise correlation greater than 0.80 among the independent variables, the findings show that neither pair-wise collinearity nor multi-collinearity will affect the regression. The greatest correlation coefficient found in this research is 0.588. As a result, the genuine independence and reliability of the variables and parameter estimates employed in this research are confirmed. The value of R square which is the coefficient of multiple determinations is 58.9 in Urban core 73.1 in Transition 76.4 in Peri-phery and 53.9 in city wide and are significant at 0.001 alpha level. The empirical

estimations clearly reveal that household size; cross ventilation at the living rooms, cross ventilation at the bedrooms, toilet systems, water sources, kitchen location, kitchen usage, sewers quality, age of building, and energy sources have impact on inhabitants' health. Effective sanitation, urban regeneration, and potable water distribution should be the focus of government programs are the recommendations.

Keywords---housing, health, housing quality, inhabitants, urbanizing impact.

Introduction

Housing has a significant impact on an urban community's health, efficiency, and well-being; other environmental aspects within which housing is supplied and in which urban people live are also related with housing [1]. Housing that is not up to code is a big problem. Because of the lack of sanitation and rubbish disposal, it may be an area where illnesses spread swiftly. Lack of clean water for washing and drinking can also cause diseases [2]. The list of health issues caused directly by inadequate living circumstances is extensive, ranging from psychological and physiological impacts to particular illnesses of varied degrees of severity and morbidity. There is a huge and considerable amount of scientific research that shows there are direct causal linkages between various features of substandard housing and certain health issues. Infectious disorders, non-infectious respiratory ailments such as asthma, as well as social and psychological difficulties have all been linked to substandard housing [3]. The quality of one's home has an effect on one's health; a decent home is linked to greater health. Poor housing is associated with an increased risk of cardiovascular diseases, respiratory disease, rheumatoid arthritis, depression and anxiety, nausea and diarrhea, infections, allergic symptoms, hypotemia, physical injury from accidents, and food poisoning, according to research based on various sources of housing and health [4]. Poor living conditions, according to UK research, may raise the likelihood of serious health difficulties or impairment by up to 25% in childhood or early adulthood [5]. The state of housing and the interior environment have a big effect in influencing the health of residents, according to the [6].

In a related move, President Barack Obama issued an Executive Order in June 2010 establishing the National Prevention, Health Promotion, and Public Health Council, which brings together 17 federal departments and offices, including the Department of Housing and Urban Development (HUD). The Council explicitly acknowledges that our health is influenced by where we live, study, work, and play. The Council released a National Prevention Strategy in June 2011 that included "Healthy and Safe Community Environments" as one of four strategic areas. The statement specifically asks for the creation and promotion of housing that is inexpensive, accessible, safe, and healthy. Affordable housing may minimize stress and its negative health consequences by providing families with more home stability. By limiting exposure to allergens, neurotoxins, and other dangers, affordable housing complexes that are well-built and well-managed may help to alleviate the health concerns that come with inadequate housing.

(National Prevention Council, National Prevention Strategy, Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General, 2011 as reported by [7].

What's more pernicious is the reality that children are the ones who suffer the most from poor housing. Infectious diseases, respiratory illnesses, and psychosocial problems have all been found to be particularly prevalent in children who live in substandard housing. The relevance of this is that health consequences encountered in infancy may have a significant impact on a person's health throughout his life [3]. Good health is the desire of all humans but it is not readily available and housing is a factor in achieving good health, however quality housing is equally not readily available. The research work examined the quality of housing in the study area using the status of housing components as they impacted on the health of residents in the three zones of the study area.

Study Area

Ado-Ekiti is the research area. It is situated in Nigeria's southwest. Ado-Ekiti is one of Nigeria's oldest towns. Its history extends back to, before the Ewi dynasty was established in 1310 A.D. Around 700 years ago, the 'Oba Ado,' also known as 'Elewi,' joined the princely adventure started by numerous offspring of Oduduwa (from Ile-Ife) to establish their own domains situated there. The community began as a farmhouse in three locations: Odo-Ado, Okesa, and Adebayo. It consisted of dispersed farmsteads and houses intermingled with areas of bush and dense forest growth (8).

The city's gradual growth started in 1953, when it was designated as the headquarters of the Ekiti Division. In the first republican regime, when Ekiti Division became one of Nigeria's key regional development regions in 1963, Ado-Ekiti saw rapid growth. The establishment of further states in Nigeria in 1979 brought more changes to Ado-Ekiti, as the headquarters of the Ado-Ekiti Local Government Area was designated one of the seventeen (17) local governments (councils) in old Ondo State. However, the culmination of the sequence of adjustments in the environment took place with the founding of Ekiti State on October 1st 1996 and the designation of Ado-Ekiti as the capital city [9]. As a result, evaluating the quality of housing and its link to the health status of Ado-Ekiti citizens is critical. Ado Ekiti town has undoubtedly existed for a long time and by the year 2021 there are many houses while the city core buildings are ageing.

Literature Review

The provision of good housing has a profound influence on the health, efficiency and well-being of an urban community, also associated with housing are other environmental qualities within which housing is provided and in which urban dwellers live [1]. Substandard housing is a big problem. Because of the lack of sanitation and rubbish disposal, it may be an area where illnesses spread swiftly. Diseases may also be caused by a lack of clean water for cleaning and drinking [2]. The range of health problems which can be attributed to poor housing conditions is large, from psychological and physiological effects to specific

diseases varying in the degree of associated morbidity. There is a huge and considerable amount of scientific research that shows there are direct causal linkages between various features of substandard housing and certain health issues (as cited 3). Health problems that have been associated with poor housing include the infectious diseases, non-infectious respiratory diseases such as asthma, and social and psychological problems [3].

In the review, Bjerregaard & Bjerregaard (as reported in 3) of the Danish and other literature on housing conditions in Greenland, they conducted an epidemiological study in Upernavik town in the West Coast of Greenland over a 12-month period (1979-80) and analyzed over 2600 health care contacts by 836 residents. Three housing groups were categorized according to housing size, space per person, heating and water supply; social class based on education, occupation and source of income was also determined. The results indicated that:

- Residents of Upernavik town, predominantly Native Greenlanders [Inuit and mixed Inuit-European], when compared with Aarhus, Denmark, had age-standardized contact ratios greater than unity for pregnancy, skin disorders and accidents, and less than unity for neoplasms, endocrine and cardiovascular diseases.
- Comparing Inuit with Danes living in Upernavik showed that the condition of housing and the indoor environment play a large role in determining the health of occupants. Inuit had higher outpatient and hospitalization rates, especially for skin and respiratory infections and accidents.
- Among the Inuit, the poorest housing group had the highest hospital admission and contact rate for skin infections and accidents.

The fact that children are the ones who suffer the most from poor housing is even more pernicious. Infectious infections, respiratory illnesses, and psychosocial problems have all been reported to be disproportionately frequent in children who live in substandard housing. The significance of this is that these health effects experienced in childhood may influence the health of the person throughout his life course (Power and Hertzman noted in 3). [6] concluded that condition of housing and the indoor environment play a large role in determining the health of occupants. Also, housing factors that have been identified as contributing significantly to poor health outcomes include temperature, humidity, ventilation, overcrowding, affordability and fuel poverty.

The quality of the house has impact on health; a good house is associated with better health. The exact relationship between poor housing and health is complex and difficult to assess, however, research based on the various sources of housing and health suggests that poor housing is associated with increased risk of cardiovascular diseases; respiratory disease; rheumatoid arthritis; depression and anxiety; nausea and diarrhoea; infectious; allergic symptoms; hypotemia; physical injury from accidents and food poisoning [4]. Housing is thus a fundamental component of quality of life. People can't satisfy their other fundamental requirements or participate fully in society if they don't have a suitable place to live. Housing issues can have flow-on effects for health, education and well-being [10].

Housing quality, as measured by environmental exposure, has an influence on health as well. Physical health is harmed by contaminants such as lead, radon, molds, and excessive temperatures (due to insufficient heating and cooling systems), as well as housing factors that increase the danger of falls or fires. Loud or continuous noise, as well as insufficient lightning, may have an impact on sleep quality and mental health. Since the 19th century, overcrowding has been recognized as a health problem, and it has been linked to an increased risk of infectious illnesses like influenza and TB, as well as chronic disorders like asthma, cardiovascular disease, and depression. Housing affordability, stability, and quality are all important factors in one's health and happiness. Housing is a human right, according to the United Nations Declaration of Human Rights, since it is essential to sustaining a decent quality of life. Social inequity and health inequalities are compounded in the lack of cheap, secure, and high-quality housing. (Lowry, Kinger and Higgins as cited in 7).

In a related move, President Barack Obama issued an Executive Order in June 2010 establishing the National Prevention, Health Promotion, and Public Health Council, which brings together 17 federal departments and offices, including the Department of Housing and Urban Development (HUD). The Council explicitly acknowledges that our health is influenced by where we live, study, work, and play. The Council released a National Prevention Strategy in June 2011 that included "Healthy and Safe Community Environments" as one of four strategic areas. The statement specifically asks for the creation and promotion of housing that is inexpensive, accessible, safe, and healthy. Affordable housing may minimize stress and its negative health consequences by providing families with more home stability. By reducing exposure to allergens, neurotoxins, and other risks, well-constructed and well-managed affordable housing complexes may lessen health issues linked with inadequate housing. (National Prevention Council, National Prevention Strategy, Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General, 2011 as reported by 7).

Again, poor housing quality also affects mental health, and these effects are especially profound in children. Among the housing factors investigated, including cost, stability, and ownership, [11] found that poor quality housing was the most constant and greatest predictor of emotional and behavioral difficulties among low-income children and youth. Other characteristics of low-income people include low educational qualifications, predominance of very high density and largely without basic services [12]. [13] identified seven dangerous health deficits to which these persons are subjected as a result of these factors. These are:

- i. Faecal related diseases;
- ii. Vector borne diseases;
- iii. Air borne diseases;
- iv. Contact diseases;
- v. Non-specific sickness;
- vi. Malnutrition;
- vii. Physical injuries at home due to defects in the construction of the houses they live in.

The rationale for consistent adequate housing in any society, according to [14], is to minimize overcrowding, to provide for those without homes, to provide shelter for an ever-increasing population, to maintain existing houses and replace dilapidated ones, for health reasons, and to improve housing technology. In addition to these advantages, the quality of a location's housing impacts the health and longevity of its residents to a considerable degree. To summarize, it is for these reasons that every government in the world should place such a high priority on affordable and proper housing construction.

There is a strong and rich body of historical research documenting the association of poor housing conditions and health, both nationally and internationally. Inadequate environmental housing conditions have been known to have a direct- and indirect-adverse impact on health. Environmental evidence related to poor housing and ill health is perhaps the most clearly established. For instance, crowded housing conditions have been associated with a higher likelihood of exposure to different pathogens which can cause various forms of infectious diseases, particularly respiratory infections (as cited in 5). Tuberculosis, for example, is one such disease where there is strong national and international literature indicating increased transmission rates in overcrowded conditions, both for children and adults. The connections between poor housing quality and respiratory health have also been internationally established for non-communicable diseases, such as asthma and chronic obstructive pulmonary disease (COPD). Research from the UK indicates that poor housing conditions can increase the risk of severe health issues or disability by up to 25 percent in childhood or early adulthood (as cited in 5).

Research Methodology

The study's goal was to analyze housing quality in connection to inhabitants' health in Ado-Ekiti, therefore comprehensive coverage of the whole town was critical. Three residential zones in the town were clearly specified to obtain effective coverage. Urban Core, Transitional, and Urban Periphery were the three categories [15]. Also, according to [16], the three zones are the city centre, the periphery neighborhood to the core, and the suburb.

The following is a description of the three zones:

- a. The Urban Core: The zone encompasses Ado -Ekiti's city centre. It is the city's historic district. It is mostly occupied by low-income workers, with a few rich Ado-Ekiti natives who seem to be drawn to the region because of their attachment to traditional connections and obligations. Idolofin, Okeila, Okeyinmi, Ogbon Ado, Ogbon Oba, Odo Ado, Irona, Ereguru, Mugbagba, Oke Agidi, Inisanya, Imayo, OkeAge, Ojido, Imayo and Idemo are all part of the urban core.
- b. Transition Zone: This is the zone that is closest to the urban core. In general, the housing and environmental conditions in this zone are better than in the city center. In this area, there have been few recent developments. Dallimore, Similoluwa, Ajilosun, Awedele, Textile, Adebayo, Basiri, Omodara, Okebola, Omolayo, Cocacola, Moferere, Olujoda, Adegun,

Jimoh Aliu, Nova, Opopogboro, Okeoniyo, Onigari, Bamigboye, Housing road are all part of Ado Ekiti's transitional zone.

- c. The Urban Periphery: This zone is home to the most contemporary structures and projects. In this zone, growth spreads in many locations all around the transitional zone, although it seems that development control laws and regulations are followed. Ureje, Ajebandele, Olorunda, Olorunsogo, Off Afao road, Igirigiri, Erifun, S I Ojo, Oshodi, Ilawe road and Sije. There are housing estates in this zone namely Fayose estate, Obasanjo estate, Federal Government housing estate, State Government housing estate, Irewolede housing estate and Shelterview housing estate

The city was divided into the three (3) zones stated above for this study: the urban core, the transitional zone, and the urban periphery. With regard to the number of dwellings in these zones, the main assumption was that twenty-five percent (25%) of the entire population lives in the urban core, fifty percent (50%) lives in the transitional zone, and twenty-five percent (25%) lives in the periphery zone.

The anticipated population number for Ado-Ekiti in 2015 was 447,599. In Nigeria, the average family size is 4.2 in the city, 4.9 in the countryside, and 4.6 in total (17). With a total average family size of 4.6, this means that there were 97,304.13 homes in Ado-Ekiti. The sample size for this study was 1500, which represents 6% of the homes in Ado-Ekiti. The 6 percent was deemed adequate because [15] used a 4 percent sample size in a related study in Ado-Ekiti, and [18] claimed that studies had used smaller proportions but produced credible results, citing Arimah (1994, 1985) who used 2.7 percent and 1.85 percent in his studies of Ibadan Housing Markets. When comparing the population figures of Ibadan and Ado-Ekiti, it was concluded that the 6% sample size was plausible and rational.

The questionnaire was administered using a systematic random sample approach to guarantee appropriate representation of the whole houses in Ado Ekiti. According to the previously assumed percentages of the three zones, 375 (25%) questionnaires were distributed in the urban center, 750 (50%) in the transitional zone, and 375 (25%) in the outer zone. The house owners were the respondents, and if a house owner was not accessible or available, the wife or the oldest tenant was used as the respondent.

The association between home quality and occupants' health was determined in this study utilizing perceptual factors. Relationships are measured using variable ASSMHE. The variable highlights the success or failure of housing quality as it relates to housing users' health. The variables used to build the model are listed in Table 1. Family size is one feature that might provide a housing difficulty; overcrowding is common in undeveloped and developing nations and overcrowding leads to illness and could lead to sickness spreading quickly; so, Housiz is an attribute that assessed the amount of crowdedness of the household. In buildings, ventilation is crucial, and cross-ventilation is particularly important. SIDWL and SIDWB measure the placement of windows in the living room and bedrooms, respectively. Cross ventilation can only be performed with a minimum of two windows on a minimum of two walls that are either opposite or on two walls that are perpendicular to each other. Toilets come in a variety of shapes and sizes, including water closets, pit latrines, forest deposits, and hole

digging. However, since the water closet toilet system (WC) is the most desirable and acceptable, TOISYM was used. Water is necessary for human existence, and its portability must not be jeopardized, therefore SORWAT assessed the water sources in the research region. Food preparation is equally important, which is why the location of the kitchen (either outside or inside the building) and its use are both important (either jointly or individual use). As a result, KITLOC and KITUSA are used to track the position and use of kitchens. Building users generate waste, particularly liquid waste in the form of waste water. Because these waste waters are discharged into sewers, SEWCON is an attribute that was used to measure the sewer's condition. AGEBLD is a variable that measured the impact of a building's age on its structural elements. SORNGY evaluated the source of energy utilized in the study region since energy is crucial for home users for lighting and cooking.

Table 1. Definitions of Research Variables

SN	Variable Code	Definition of Variable
1	ASSMHE	Assessment of Health
2	HOUSIZ	Household Size
3	SIDWL	Location of Windows in the living rooms
4	SIDWB	Location of Windows in the Bedroom
5	TOISYM	Toilet System/type
6	SORWAT	Sources of Water
7	KITLOC	Location of the Kitchen
8	KITUSA	Kitchen Usage
9	SEWCON	Condition of Sewers
10	AGEBLD	Age of Building
11	SORNGY	Sources of Energy

Source: Authors' Fieldwork, 2021

The Model

For the empirical estimate of analysing the parameters, this work used double-log multiple (logistic) linear regression. According to [19], the advantages are as follows:

- The R2 has a lot of explanatory power.
- The ability to provide regression coefficients as elasticity estimates directly
- Errors are evenly distributed across the estimate parameters as a result of the decrease in homoscedasticity.

The equation is written in its general form as:

$$y = a + b_1x_1 + b_2x_2 + \dots + b_nx_n + e \quad (1)$$

The format for the double log is as follows:

$$y = a + b_1 \ln x_1 + b_2 \ln x_2 + \dots + b_n \ln x_n + e$$

The parameters to be calculated are b_1 - b_n 10.
 X_1 - X_n are the independent variables (predictors) listed above.
 Y stands for the housing evaluation, which is the dependent variable.

HOUSIZ, SIDWR, SIDWB, TOISYM, SORWAT, KITLOC, KITUSA, SEWCON, AGEBLD, SORNGY are the elements that have been identified as having an influence on the health of home users in terms of housing quality. The issue of spatial auto rectification and the problem of two or more variables aligning multi-collinearity has been one of the most significant challenges in the usage of regression models [17]. It is critical to avoid such occurrences in order to verify the different estimations from the model. As a result, it was necessary to first check for such inter-correlation among the variables utilized in this study's model. When pair-wise correlation coefficients among independent variables surpass 0.80, collinearity or multi-collinearity has a significant impact on regression coefficients [18]. In Table 2 there is no pair-wise correlation greater than 0.80 among the independent variables, the findings show that neither pair-wise collinearity nor multi-collinearity will affect the regression. The greatest correlation coefficient found in this research is 0.588. As a result, the genuine independence and reliability of the variables and parameter estimates employed in this research are confirmed. As a result of these variables, the regression equation for this study could be written as follows:

$$\ln(\text{ASSMHE}) = a + b_1 \ln(\text{HOUSIZ}) + b_2 \ln(\text{SIDWL}) + b_3 \ln(\text{SIDWB}) + b_4 \ln(\text{TOISYM}) + b_5 \ln(\text{SORWAT}) + b_6 \ln(\text{KITLOC}) + b_7 \ln(\text{KITUSA}) + b_8 \ln(\text{SEWCON}) + b_9 \ln(\text{AGEBLD}) + b_{10} \ln(\text{SORNGY}) \dots\dots\dots(3)$$

Table 2: Correlation matrix for health variables Ado-Ekiti

	HOUSIZ	SIDWL	SIDWB	TOISYM	SORWAT	KITLOC	KITUSA	SEWCON	AGEBLD	SORNGY
HOUSIZ	1	.508**	.439**	.399**	.297**	.265**	.167**	.158**	.126**	.094**
SIDWL		1	.519**	.483**	.337**	.335**	.246**	.191**	.176**	.146**
SIDWB			1	.565**	.447**	.397**	.353**	.273**	.246**	.212**
TOISYM				1	.520**	.525**	.409**	.351**	.306**	.223**
SORWAT					1	.521**	.450**	.346**	.330**	.240**
KITLOC						1	.588**	.455**	.440**	.348**
KITUSA							1	.507**	.539**	.405**

SEWCON								1	.494**	.404**
AGEBLD									1	.570**
SORNGY										1

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' Field Work, 2021

Results and Discussion

The results of the multiple regression model in Tables 3, 5, 7 and 9 show some level of stability and the influence of the parameters, this is because the value of R^2 which is the coefficient of multiple determination is 58.9 in Urban core 73.1 in Transition 76.4 in Peri-phery and 53.9 in city wide and are significant at 0.001 alpha level.

Five characteristics are crucial in the evaluation of housing quality in the urban core because it impacts the health of housing users, as shown in Table 4. HOUSIZ, SIDWB, TOISYM, SORWAT and AGEBLD have coefficients of .786, .125, -.224, .207 and .149 respectively. The right reading is that 100% reduction in the TOISYM and AGEBLD will lower the effect by 22.4 percent and 14.9 percent respectively. Furthermore, a 100% improvement in HOUSIZ, SIDWB and SORWAT improves housing quality and health status by 78.6%, 12.5% and 20.7%, respectively. A functional area with cross ventilation brings in more and fresher air at all times, resulting in comfort and increased health. It had been established that household size affects health status of house users hence overcrowding is negative to health status. Again, building age is associated with weakness, dilapidation, and disrepair; the buildings in the urban core are old, and many are in a state of disrepair; the houses must be restored in order for users to live in a healthy environment.

Table 3: Model Summary on Urban Core

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.777	.603	.589	.13038

Source: Authors' Fieldwork, 2021

Table 4: Pooled regression analysis result for health variables in urban core of Ado-Ekiti

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		

(Constant)	2.048	.095		21.558	.000
HOUSIZ	.452	.031	.786	14.813	.000
SIDWL	.041	.026	.066	1.538	.125
SIDWB	.067	.023	.125	2.851	.005
TOISYM	-.118	.027	-.224	-4.335	.000
SORWAT	.083	.016	.207	5.064	.000
KITLOC	.052	.024	.087	2.157	.032
KITUSA	.019	.023	.033	.832	.406
SEWCON	-.029	.021	-.054	-1.335	.176
AGEBLD	-.088	.031	-.149	-2.803	.005
SORNGY	-.018	.036	-.022	-.497	.619

Source: Authors' Fieldwork, 2021

In Table 6, five parameters are significant in the study area at the transition zone: SIDWL, SIDWB, SORWAT, SEWCON, and AGEBLD, with coefficients of .419, -.434, .819, -.083, and -.152 respectively, and all are at the 0.001 alpha level. According to the interpretation, any qualitative improvement, such as doubling the number of windows on two wall sides in the living room and improving water sources, will improve health by 41.9 percent and 81.9 percent respectively, while any reduction in the windows at the bedroom, lowering the standard of sewer management and as building begin to age, health of occupants will be reduced by 43.4 percent, 83 percent and 15.2 percent respectively. Due to their shallow depth and exposure to external environmental conditions, hand dug wells are not portable, making them vulnerable to subsurface pollution and other contaminants. On physical inspection it was found out that water pipes are broken, corroded water pipes, and fights at water points plague government provided tap water, which is the sole approved supply of drinkable and portable water. Furthermore, the sewers in the research region are in poor condition. Waste droppings clog the sewers, allowing water to be kept and pond for mosquito reproduction.

Table 5: Model Summary on Transitional zone

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.857	.735	.731	.10404

Source: Authors' Fieldwork, 2021

Table 6: Pooled regression analysis result for health variables in transitional zone of Ado-Ekiti

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.393	.057		24.236	.000
HOUSIZ	.003	.010	.006	.311	.756
SIDWL	.112	.016	.419	7.101	.000
SIDWB	-.102	.013	-.434	-7.593	.000

TOISYM	-.002	.010	-.005	-.243	.808
SORWAT	.653	.019	.819	33.675	.000
KITLOC	.017	.013	.027	1.365	.173
KITUSA	.002	.012	.003	.159	.874
SEWCON	-.069	.019	-.083	-3.630	.000
AGEBLD	-.101	.015	-.152	-6.680	.000
SORNGY	.010	.008	.027	1.309	.191

Source: Authors' Fieldwork, 2021

HOUSIZ, SIDWL, SORWAT, KITLOC and KITUSA are significant in Table 8, at the peri-phery, with coefficients of .782, .252, .213, .473 and -.855 respectively. The results mean that a 100 percent improvement in household size, a 100 percent increase in cross ventilation, a 100 percent increase in water source, a 100 percent increase in kitchen condition and a 100 percent increase in sewer management will result in 78.2 percent, 25.2 percent, 6 percent, 21.3 percent and 47.3 percent improvement in people's health while a 100 percent reduction in kitchen usage will reduce the health of people by 85.5 percent. Additionally, kitchens placed outside the building are vulnerable to unfavorable environmental variables and food poisoning and kitchen space that are used by two or more persons or households are not desirable because of different levels of cleanliness and mode of food preparation.

Table 7: Model Summary on Peri-phery

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.878	.771	.764	.08748

Source: Authors' Fieldwork, 2021

Table 8: Pooled regression analysis result for health variables in the peri-phery of Ado-Ekiti

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.209	.072		16.794	.000
HOUSIZ	.260	.025	.782	10.420	.000
SIDWL	.175	.030	.252	5.765	.000
SIDWB	.039	.017	.066	2.309	.022
TOISYM	.005	.014	.011	.399	.690
SORWAT	.077	.012	.213	6.535	.000
KITLOC	.359	.030	.473	12.006	.000
KITUSA	-.272	.025	-.855	-10.773	.000
SEWCON	.029	.014	.058	2.070	.039
AGEBLD	.012	.013	.025	.886	.376
SORNGY	.000	.009	-.032	-.032	.075

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Source: Authors' Fieldwork, 2021

On a citywide scale, all parameters are significant. In Table 10, the factors display a regression of -.116, .242, -.119, .451, -.077, .542, .425, .542, .505, -.312 for Household size, location of windows in the living rooms, location of Windows in the Bedrooms, Toilet system, Water sources, Kitchen location, Kitchen usage, Sewers Condition, Age of Building and Sources of Energy respectively. A 100 percent reduction in household size, location of bedroom windows, Sources of water and Energy Source will reduce the health status by 11.6 percent, 11.9 percent, 7.7 percent and 31.2 percent respectively. Also, 100 percent increase in Living room window, Toilet system, Kitchen location, Kitchen Usage, Sewer Condition, and Age of building will improve the people's health with 24.2 percent, 45.1 percent, 54.2 percent, 42.5 percent, 54.2 percent and 50.5 percent respectively.

Table 9: Model Summary on Citywide zone

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.736	.542	.539	.13362

Source: Authors' Fieldwork, 2021

Table 10: Pooled regression analysis result for health variables in the citywide of Ado-Ekiti

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.663	.042		39.818	.000
HOUSIZ	-.070	.019	-.116	-3.653	.000
SIDWL	.103	.019	.242	11.614	.000
SIDWB	-.041	.009	-.119	-4.541	.000
TOISYM	.079	.006	.451	13.585	.000
SORWAT	-.013	.007	-.077	-1.845	.000
KITLOC	.094	.008	.542	11.917	.000
KITUSA	.253	.018	.425	13.674	.000
SEWCON	.130	.013	.542	9.683	.000
AGEBLD	.095	.008	.505	12.296	.000
SORNGY	-.070	.013	-.312	-5.419	.000

Source: Authors' Fieldwork, 2021

This study has specifically highlighted that adequate windows in the bedrooms in terms of cross-ventilation and water source are significant to affect the health state of people in all the three zones: urban core, transitional and periphery while household size and kitchen location are significant in Urban core and Periphery,

Also, window at the lounge/living room and sewer condition and significant at Transitional and Periphery, age of building is significant at Urban core and Transitional. Toilet system is only significant at the urban core while kitchen usage is significant at the periphery.

Conclusion and Recommendation

Household size, number of windows on wall sides in bedrooms and living rooms, toilet system and types, water sources, kitchen location/usage, sewage quality, building age, and energy sources are all elements impacting the health of housing users. The results show that the effect of house size is significant in both the urban core and the periphery, window location in the living room is significant in both the transition zone and the periphery, toilet system is only significant in the urban core, sources of water are significant in both the transition and periphery, kitchen location is significant in both the urban core and the periphery, kitchen usage is only significant in the periphery, sewer condition is significant in transition and periphery, age of building is significant in the three zones and lastly sources of energy is only significant in the urban core.

The significance of government policy in making a real difference in the field of housing quality cannot be overstated; government policy on housing quality should be properly defined, operational, and successful, [20], recommended that the Government should participate in urban revitalization and reconstruction of the urban centre, and give soft loans to house owners through cooperative societies, registered landlord organizations, and craftsmen groups, according to this study, these recommendations are still relevant. Sanitation authorities at government establishments should efficiently solve drain and sewer difficulties; individuals should be discouraged from throwing rubbish into sewers; those responsible should be penalized; and regular sewer cleaning would go a long way. Houses without or with broken drainage should also be required to have or repair them. Houses that do not have a water toilet system should be required to have one. Kitchens are positioned outside the structure in all three zones and are often in poor condition; this kind of kitchen should be avoided. The sole drinkable supply of water is tap water, which falls within the jurisdiction of the government; this should be addressed by both the Federal and State government. The pipe works should be extended to all zones, existing broken pipes should be repaired, and Ado-current Ekiti's water system should be enlarged and effectively supported. Water should be delivered on a regular basis to existing water location points to avoid regular rancor witnessed during the course of this study.

The age of a structure cannot be lowered; nevertheless, the quality of the building structure should be enhanced. As a result, the government should implement regulations and legislation requiring owners of decaying buildings to update, repair, or sell their properties, with a proviso that the government should acquire the structures after a certain stipulated period of time. Finally, the government should guarantee that the study area's urban regeneration is well-coordinated and well-funded, with quality and experienced professionals involved.

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