16 Sustainable Housing Provision in Post COVID-19 Era in the Developing World: Challenges for the Architects

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Abstract

The surge of urbanization in the developing economies of the world has resultant effect on housing condition. However, housing is pivotal to the overall well-being and total quality of life of individuals and is believed to be both the cause and cure of Coronavirus pandemic, a respiratory problem plaguing the world today. This is due to the fact that people spend more time in houses during lockdown. This paper therefore examined the impact of housing conditions on the Coronavirus pandemic in the developing economies of the world in order to suggest strategies that will make architects create a sustainable environment for human habitation in the post-pandemic era. A historical survey method was employed and data was collected from secondary sources. The paper finds that there are various dimensions to housing condition which aid the spread of the pandemic and have impacts on residents' health. The paper therefore suggests that architects need to provide functional and flexible spaces, connect houses to the outdoors and adopt the principle of universal design among others in order to allow air into the building.

Keywords

Surge of urbanization · Developing economies · Housing condition · Coronavirus pandemic · Architect

16.1 Background

The World Health Organization (WHO 2004) sees housing as the residential environment, neighbourhood, micro district or the physical structure which mankind uses for shelter. Housing includes the environment of a structure, the necessary facilities, equipment and the devices needed for the physical health and social well-being of the family and the individual. Housing is a unit of the environment which has a profound influence on the health, efficiency, social behaviours, satisfaction and well-being of the community. One issue that stands out in housing is the factor of physical health and social well-being of the individual and his household which presupposes an uncompromising stance in the total comfort, which housing is expected to provide. This therefore exemplifies the inexorable linkage between housing and health.

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In the last three years, Coronavirus pandemic has become a bickering issue in all the countries of the world and housing is regarded as both the cause and the cure. Housing is a fundamental human right and it is entral in the battle against COVID-19. Without adequate housing, it is impossible to carry out social distancing and good hygiene practices. Thus, housing has become the front line defense against coronavirus pandemic (UN 2020). It is attributable to the increasing realization that the house environment produces some dangers to human health and life (Kothari 2001; Luthi 2001).

Several studies have affirmed that the psychological well-being of man is dependent on the quality of the house he lives in among others Ellaway et al. (2001), Breysse and Forr (2004), World Health Organization (2004), Gary (2006), Bonnefoy (2007), Vasconcelos et al. (2011), Odunjo (2014) and Battersby (2015). All these studies have related housing problems to the psychological well-being or socio-emotional health and social-well-being in terms of healthy and happy living. This is described in terms of human behaviour vis-a-viz dwelling design and maintenance, in relationship with housing safety and accidents. According to Patrick et al (2003), residential injuries are linked to the home environment which may happen because of home design (stairs, lighting, flooring, railings and windows). Others may happen due to poor maintenance of home design elements such as electricity and household appliances (WHO 2004). Also, fear and crime have insidious effect on human lives and they are linked to factors related to building design, condition, quality, management and the immediate house environment. Thus, residential environment plays important role in determining individual well-being and health status. The World Health Organization (WHO) reckons that it is the home, not the clinic that is the key to better health delivery system. The impact of poor housing is on the increase in the world and it has caused series of health challenges which has led to death in many cases (Bonnefoy et al. 2003). All these health challenges can be ameliorated if adequate consideration is given to housing quality, in terms of design and adequate provision of the needful.

In the developing world, unprecedented urbanization has been a common feature since the last century (Awolola 2014; Odunjo 2020). This has been in form of rapid population growth and physical expansion of cities in which housing problem is prevalent. As population increases and space becomes limited in the city, housing problems escalate. Poor housing conditions such as slum, overcrowding and high density are associated with greater spread of COVID-19 and people have to spend more times in homes. Though, this is not the first time in human history that pandemics affect cities, limited literature relating to housing and pandemics existed before the emergence of COVID-19 pandemic (Matthew and McDonalds 2006). According to Wade (2020), urban research relating to pandemics mainly focussed on issues such as inequalities that make poor and marginalized groups more vulnerable to pandemics The recent pandemics has brought to the fore the issue of housing vulnerability to pandemics and has resurrected interest in this topic. As housing is a medium of spread, better knowledge of the adaptation measures is needed. This paper therefore assesses the impact of housing condition on Coronavirus pandemic. It uses the developing world as a case study and at the end; enumerates the challenges of architects for sustainable housing design at post COVID-19 era.

16.2 Conceptualization and Review of the Literature: Housing and Public Health

Poor housing conditions are associated with a wide range of health conditions, including respiratory infections and asthma. Addressing housing issues offers public health practitioners an important social determinant of health and public health has long been involved in housing issues. In the nineteenth century, health officials targeted poor sanitation, crowding and inadequate ventilation to reduce infectious diseases. Today, public health departments can employ

multiple strategies to improve housing, such as developing and enforcing housing guidelines and codes, implementing "Healthy homes" programmes to improve indoor environmental quality, assessing housing conditions, and advocating for healthy affordable housing.

Housing is an important determinant of health and substandard housing is a major public health issue (Sharfstein and Sandel 1998). Each year in the United States, 13.5 million nonfatal injuries occur in and around the home (Warner et al. 2000), 2900 people die in house fires (Kartel 2000) and 2 million people make emergency room visits for asthma (National Hospital Ambulatory Medical Care Survey 1998). The public health community has grown increasingly aware of the importance of housing as a social determinant of health (Marmot and Willinkinson 1999), yet defining the role of public health practitioners in influencing housing quality has been challenging and the responsibility for social determinants of health is seen as lying primarily outside the scope of public health, but left at the door of the architects that design the houses.

Thus, housing and health as concept is wide in nature and requires a holistic approach in analysis. Healthy housing does not mean a specifically designed imaginary house, rather it simply means one that provides an environment that is safe, comfortable and hygienic and the one that empowers individuals in achieving their aim. An attempt made to describe healthy housing was "adequate housing" which is defined as more than having a roof over one's head. The conditions of adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water supply, sanitation and waste management facilities; suitable environmental quality and health-related factors; as well as adequate and accessible location with regard to work and basic facilities. All of these should be available at an affordable cost and are said to be the conditions for a house to be adequate (Bonnefoy et al 2003). In a more concise manner, Pollack et al. (2010) summarized all these conditions to be the physical conditions within homes; conditions in the neighbourhoods surrounding homes; and housing affordability, which do not only shape home and neighbourhoods conditions, but also affect the overall ability of families to make healthy choices.

16.3 Methods

The research is qualitative in nature and historical survey approach was adopted, while content analysis was employed in the presentation of the data collected.

16.3.1 Urbanization in the Developing World

Every country in the developing world is experiencing urbanization in different dimensions. Urbanization is the increased concentration of people in cities rather than in rural areas (UNCHS-Habitat 2011). Demographic Partitions (Urbanization in 2013) describes urbanization as the process by which towns and cities are formed and become larger as more people begin living and working in central areas. It is the gradual increase in the number of people living in urban areas, with subsequent decrease in those living in rural areas (World Health Organization 2018).

The population of towns and cities in the developing world has been growing at a fast pace with the population doubling in almost every three to four decades. The effect of this trend on the physical, social and the natural environment is heavy. According to Abanyam and Dankano (2019), urbanization in the developing world are faced with numerous challenges such as high population density, inadequate infrastructure, lack of affordable housing, pollution, slum creation congestion and poverty.

It is estimated that by 2050, more than two-thirds of the world's population will live in cities, up from about 54% today. This rapid, often unplanned urbanization brings risks of profound social instability, risks to critical infrastructure, potential water crises and the potential for devastating spread of disease such as COVID-19 that

is being experienced presently global Risks (2015). Nigeria as a typical example experienced one of the fastest rates of urbanization between twentieth and twenty-first centuries Fadamiro et al. (2005). Today, there are more than 840 urban centres and well over 10 cities with a population of over 1 million (Table 16.1). The result is overcrowding and increased pressure on facilities.

Thus, urbanization problems are by nature both generative and cumulative. The rapid population growth has serious problems for physical and socio-economic development because of the inability of the existing institutions to cope with the challenges of high dependency rate. However, the Delos Declaration of 1962 made it clear that measures should be taken to prevent the uncontrolled expansion of metropolitan areas and to organize them in a more humane way. Similarly, many international academic bodies have devoted their energies to exploring ways of understanding urban processes and how they can be manipulated for human welfare. In the same manner, the United Nations conference on the human environment which took place in Stockholm in 1972 devoted three of its twenty-six declarations to the built environment. Economic and social development is essential for insuring a favourable living and working environment for man and for creating conditions on Earth that are necessary for the improvement of the quality of life.

In order to curb urbanization therefore, governments of the developing world need to adopt an integrated and co-ordinate approach to development with a view to protecting and improving the human environment for the benefit of people. Planning must be applied to human settlement and urbanization with a view to avoid adverse effects on the environment and obtain maximum socio-economic and environmental benefits for all. Therefore, there is need to check urbanization in order to make towns and cities livable and workable.

16.3.2 Housing Problems

Rapid urbanization in the developing world has substantially increased the need for urban housing (Olotuah 2000). Housing the teeming population and provision of the required services is a formidable task for successive governments. During COVID-19 lockdowns, people were restricted to their homes for most of the day and this highlighted serious housing failures and inequities. Stay at home orders led to a heightened awareness of both positive and negative

Table 16.1 Urban population in Nigeria (1921–2025)

Year	Total population (in millions)	% Rural	% Urban
1921	18.63	95.2	4.8
1931	19.93	93.3	6.7
1953	30.30	90	10
1963	55.65	89.8	19.2
1973	79.76	78	22
1991	88.5	68	32
1996	102.52	60	40
2000	128.8	56	44
2005	147.6	51.8	48.2
2010	168.4	48	52
2015	190.9	44.9	55.1
2020	214.5	41.8	58.2
2025	238.4	39.1	60.9

Source Awolola (2014)

aspects of housing and changed how people experience and interact in homes. As a result, housing problems and their effects on the physical and mental well-being of occupants were brought to the forefront.

Though, there is no country in the world that is void of housing problems; there are various dimensions to housing challenges in the developing world. What is obtained is slum or squatter settlements which is haphazard or unplanned pattern of development of housing in which large sections sprang up through the efforts of the informal sector without any form of regulation (Fadamiro et al. 2005). According to BBC (2022), many new immigrants to cities in developing world cannot afford housing and as a result, they are forced to build temporary accommodation in spontaneous settlements. These settlements are commonly known as "shanty towns". They are also called favelas (Brazil) or bustees (India).The main features of a shanty town are: houses are made from scrap materials such as wood and metal sheeting; often, housing does not have services such as sanitation, water or electricity and the settlements are usually crowded. This can aid the spread of Coronavirus pandemic as slums are unsafe and unhealthy and characterized by lack of windows and indirectly lack fenestration which can cause shortage of breath.

Also, the monumental deficiency in housing in the developing world manifests both in qualitative and quantitative terms. Buildings are often congested as the urban population is largely made up of low-income earners who are mostly in irregular and informal employment. They have housing problems such as lack of space. This is because the proportion of the population living in urban centres has increased phenomenally over the years. The incidence of this population in urban centres created severe housing problems, resulting in overcrowding in inadequate dwellings with lack of spaces for individual activities and is a catalyst for the spread of Coronavirus pandemic.

Having access to quality affordable housing is fundamental to reduce poverty. Many people are moving from rural areas to cities for work in the developing world and therefore need to be housed in an affordable shelter. However, the developing world is plagued with the problem of unaffordable housing with resultant effect on homelessness, thereby aiding contact with an infected person. Hence, there is need to guarantee a sustainable growth. For this reason, it became one of the objectives of UN Sustainable Development Goals number 11. The aim by 2030 is to put housing at the centre of specific policies to reduce drastically the quantity of people living in conditions below the minimum standards (UNCHS-Habitat 2022).

There is also the problem of shortage of adequate housing facilities. The shortage of water supply for example is a problem for cooking, bathing and most importantly for toilet activities. During the lockdown, proximity to source of water was a big challenge and residents used to go far places to fetch water. Erratic power supply is another challenge as houses always have epileptic power supply, as a result of which some are in constant use of solar power or generator. Also, many houses share housing facilities such as toilet in Brazilian type building and problems may emerge. For example, a person in isolation may spread the disease to other occupants which may lead to death if care is not taken.

Furthermore, poor housing conditions such as overcrowding and high density are associated with greater spread of *COVID*-19. However, people have to spend more time in homes that are overcrowded, damp or unsafe. According to Adesola (2017), overcrowding is a specific happening clinically observable and definable. Overcrowding occurs when organisms are brought together in such a manner and numbers as to produce physical reactions of stress; important among these reactions is stepped up activity of the adrenal glands. When these reactions to stress are widespread and sustained, they are followed by physical weakening, sometimes rage and violence of extreme passivity and a breakdown of orderly group behaviour. What may follow is a tidal wave of death, ending when the population is no longer crowded. Thus, when a house or room is overcrowded, a single contact

Table 16.2 Occupancy ratio in selected cities in Nigeria

Town	Household occupying room (%)	Average number of persons per room
Lagos	74.2	4.1
Ilorin	38.2	2.6
Kaduna	73.5	3.8
Benin City	48.0	2.2
Ibadan	4.1	–

Source Awolola (2014)

with *COVID-19* carrier will aid in the transmission of the disease to the other. Also, overcrowding is an aberration to the disease in the sense that there is shortage of air supply to the occupants of the building (Table 16.2).

In considering the global need for housing in the United Nation Development decade (1960–1970), it was stated that over 1000 million people in Africa, Asia and Latin America had about half the total population homeless or living in houses which purported danger to human health which is an affront to human dignity. In addition, it was estimated that over 200 million inhabitants would crowd into the cities during the development decade. In recognition of the magnitude of present and future housing needs, the United Nations estimated that an annual rate of housing construction of 8–10 housing units per 1000 person is needed in the developing world to overcome existing differences and meet future needs which have not been complied with by some countries. Other infectious diseases commonly associated with overcrowding are tuberculosis, meningitis and measles (Adesola 2017). Studies have shown that overcrowding could be a determining factor for deleterious social behaviour (such as prostitution and juvenile delinquency) and certainly is a hazard to health (Olotuah 2006; Odunjo et al. 2015).

The quality of the environment in most urban centres is another concern. This is dependent on organization as spatial units. The slow process of urban planning and zoning in the face of rapid urbanization in most developing countries has resulted in poor layout of buildings with inadequate roads between them and inadequate drainage and provision for refuse evacuation (Fadamiro et al. 2005). Thus, there is a high incidence of pollution (especially air pollution) and inadequacy of open spaces for other land uses. All these constitute urban poverty consequential of rapid urbanization. This manifests in the environmental stress experienced by the urban dwellers.

As Odunjo (2020) puts it, Coronavirus spread finds expression in an environment characterized by high densities of buildings, lack of space for open air living between houses, poor health and substandard housing. In addition, housing condition is a cause for concern. Housing condition relates to the physical characteristics of houses such as damp. A lot of houses are characterized by dampness and studies have linked dampness to a number of health problems, including respiratory issues such as Coronavirus pandemic. Another aspect that has to do with housing condition is whether the house has access to a garden or outside space for recreation which was brought to the fore during lockdown.

16.4 Results

16.4.1 Challenges for the Architects in Post COVID-19 Era

In order to avoid future pandemic in relation to respiratory problem, architects need to provide functional spaces in houses to allow for enough air to come in. Attention should be paid to materials used for construction, size of windows, doors and courtyards for cross ventilation to take place. Also, regular advice needs to be given to clients on the need to design based on standards. The minimum standards specified for air spaces,

setback and built up proportion should be adhered to in order to create a healthy and livable housing environment. In Brazilian houses where facilities are shared, the number of housing facilities provided must commensurate with the population on ground.

Throughout the pandemic, people were confined to their homes and every work is carried out in the different spaces of the home. Thus, the house must be made more versatile to accommodate more range of uses and spaces must be made more flexible. The flexibility of the house allows the space to evolve as the demands of the user change. Flexibility can include using active features such as movable walls and flexible elements like multi-use rooms, vast floor to ceiling heights, use of modular furniture, etc.

Following the global health crisis, people are craving increased connection to the outdoors. This has driven increased demand for private balconies and outdoor open spaces especially in high-rise multi-family residential units. Shortly, residential developments that focus on primary aspect of living such as increasing fresh air through natural ventilation and access to nature through biophilic design strategies will have an edge.

Also, there is need for conceptual retrace of communal spaces in housing developments such as multi-storey apartments in post COVID-19 era. As ventilation of corridor spaces play a role in minimizing the spread of COVID-19, external communication corridors should be examined with architectural solutions that promote privacy by hiding users from being seen from the street or nearby apartment blocks. In this wise, numerous elevators may be needed to accommodate demand.

To future-proof new residential designs in the post COVID-19 era, universal design principles need to be embraced. Thus, the house must be fully functional under normal conditions, with an added ability to function in a pandemic situation. The primary aim of the design must be to minimize the likelihood of transmission through structural, physical and practical means. Therefore, the building has to account for three spaces according to Patil (2022):

(i) **Spaces with restricted access**: A space near the entrance of the house for self-sanitation so that airborne particles can be minimized into the house.
(ii) **The threat-reduced internal space**: Humans interact and socialize with each other at various levels of intimacy, frequently mixing formal work and private spheres. Such socializing in the confines of a private residence potentially exposes the occupants to pathogens unintentionally introduced by visitors. Any post-pandemic design needs to take this into account through functionally differentiating and compartmentalizing the internal spaces.
(iii) **Space suitable for isolation**: The residence will require a bedroom for isolation. The bedroom should open to an exterior, but self-contained, courtyard or open space to provide the isolating inhabitant with safe access to the outside environment. This space can also function as a transition zone.

Therefore, architects need to invent better typologies of houses and housing that responds to various communities of residents and their accompanying cultures. The residences must include the capacity to isolate within the house compound or environment plus the possibility of communal places. Greater care should be given to artificial and natural ventilation and lighting solutions to preserve good indoor air quality and mental well-being.

Architects engage primarily in the design and the supervision of the construction of buildings and other physical components of the built environment. They play the major role in the shaping, reshaping and management of the physical fabric of the urban centres and consequently its quality. There is therefore need for architect bodies advocating for increasing and maintaining the housing stock and the provision of adequate infrastructure in houses.

Architects can encourage the use of alternative building materials such as laterite bricks/stabilized laterite bricks and cement fibre roofing materials for construction of houses instead of living in

squatter settlements or ghettos. The materials are cheaper compared with conventional building materials and architects could set the right examples by building their own houses using the indigenous approach and by encouraging government to adopt same for housing schemes.

Architect bodies could demonstrate their commitment to improving the lot of the urban poor by the rigorous pursuit of "Neighbourhood schemes" which emphasize public participation and partnership with a view to assist in the provision of infrastructure and the stemming of degradation at the neighbourhood level, e.g. the provision of central toilet facilities for compounds.

Architects could help in the increased design of self-help core housing project that is affordable depending on the income of the family. The self-help core housing project involves the provision of environmentally; friendly and structurally strong shelter units that can withstand a range of hazards. The architect can design in such a way that the owner of the house can start with the building of the core house such as living room or bedrooms to accommodate both horizontal and vertical expansion.

16.5 Conclusion

This study has discussed the impacts of housing conditions on Coronavirus pandemic in the developing economies of the world. The study revealed the dominant housing conditions which aid in the spread of the pandemic. It concluded that architects have a long way to go in post-pandemic era towards tackling future respiratory problems, and therefore suggests strategies that could be employed towards the creation of a sustainable environment for human habitation.

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