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The Effect of Housing Conditions on Social Distancing During A Pandemic in Selected Urban Slums in North Central Nigeria

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Abstract
Social distancing is one of the prescribed means of preventing the spread of deadly diseases such as COVID-19. This study aims at examining how the concepts of social distancing and self-isolation are affected by housing spatial conditions among the urban poor which comprise a demographic exposed to community spread in less-than-standard housing conditions. Through a qualitative assessment of the problem which comprised theoretical reviews and field observations, the study identifies overcrowding, multi-generational homestead composition, extreme poverty and unchecked mixed-usage of residential spaces as major challenges to effective social distancing (and self-isolation) in the Lohwol-Topp settlement in Rayfield, Jos South LGA of Plateau state, Nigeria. The study proposes firstly documentation and refined assessment of local overcrowding standards by professionals in the built environment in order to determine the extent in domestic situations as well as the standardisation of buildings using low cost materials of construction for health and well-being. The study also justifies the incorporation of possible isolation spaces in multi-generation homesteads for high risk residents in the layout of urban slum homesteads and the comprehensive documentation and monitoring of mixed use home based enterprises in urban slums which could hinder contact-tracing of random visitors.
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1. Introduction

The emergence of a harmful novel coronavirus (nCov-19) in late 2019 heralded a shift in the way people interacted with the environments in which they lived, worked, socialized and travelled (WHO, 2020). Being a viral strain with a high rate of infection without cure or a preventative vaccine, medical experts have recommended that the coronavirus now known as COVID-19 can best be contained through measures which include immediate social distancing and self-isolation of persons who display symptoms of the disease. Social distancing and self-isolation are non-pharmaceutical ways of preventing the spread of communicable diseases (CDC, 2020; SCCPHD, n.d.). More importantly, persons who are asymptomatic yet still potential carriers of the virus are furthermore encouraged to maintain a reasonable physical distance of 2m from other members of society and to self-isolate or self-quarantine for a minimum of 14 (fourteen) days following travel across international borders in a bid to reduce community spread of the disease (Maragakis, 2020)

The process of social (or physical) distancing and self-isolation resulted in a new level of interaction with residential spaces. Previously used for primarily familial interaction and personal comfort, residences have been expanded in function to include flexible work spaces ("work from home"), educational centres (for home-schooling children), recreation facilities and hubs for commercial activity due to the viral pandemic (Cramer & Zaveri, 2020, Khazan, 2020). Anthropometrically, the concept of social distancing requires an ascertainment of the average spatial dimensions required by the human body in order to perform specific functions adequately within that given space. Thus each of the expanded functions of residential spaces during the restrictive pandemic require corresponding expansion of physical space in order to cope with the additional activities as well as the requirements for the prescribed social distancing and/or possible self-isolation. This concept presents a disadvantage for the urban poor who live in cramped dwellings, informal settlements or slums where space is a scarce commodity (Barnett-Howell & Mobarak, 2020; Busso & Messina, 2020; DeParle, 2020). Social distancing is believed to be a practice used to save the lives of only the wealthiest in society who could afford the luxury of space. COVID-19 poses a greater threat to the elderly and several studies show that one of the characteristics of rich countries is a higher proportion of elderly people. However, life expectancy differs sharply between developed and developing countries: from 79.11 years (US) to 85.29 years (Hong Kong) in developed nations as opposed to 54.36 years in Central African Republic (Bezy, 2020; Worldometer, 2020).

Across the globe, poor (or inadequate) housing affects inmates, farm-workers, detained immigrants and homeless persons beyond financial poverty – the peril of proximity and forced immediacy has the capacity to increase the risk of contagion of infection and a host of other societal ills such as depressive turmoil (leading to increased rates of suicide), child abuse and domestic violence (DeParle, 2020). Nigeria has a relatively low life expectancy of 55.75 years (ranked 188th out 191 countries) and by 2014 nearly 50% of the urban population lived in slums (Adedire & Oduwaye, 2017; World Bank, 2019). Urban slums exist as informal settlements nestled within urban centres which have grown exponentially in the north central regions of Nigeria due to recent displacement

of persons from the north eastern part of the country ravaged by insurgency and insecurity (Enwerekowe & Ibrahim, 2019). This study aims at examining how the concepts of social distancing and self-isolation are affected by housing spatial conditions among the urban poor which comprise a demographic exposed to community spread due to forced immediacy. Using theoretical review and field observation, this study critically examines the characteristics of urban slum spaces, the physical challenges that arise from such spaces and the difficulties that slum dwelling creates for residents faced with a contagious pandemic.

2. Literature review: the quality and quantity of space in informal settlements

Space means different things to different disciplines – it means a blank gap between characters in literature or a generalised construct or set in mathematics. In psychology it could mean the personal freedom to think or be oneself or the state of mind one is in when daydreaming. Mayor (2009, p.1684) defines physical space as "the amount of an area or room that is empty or available to be used, especially one used for a particular purpose, within an enclosed boundary feature…" This is the concept of space that applies to architecture which is a product of the designer's logical and imaginative ability based on the interpretation of the visual perception of the brief from a client. Architectural space is multidimensional: existing as **linear** (space of line), **planar** (space of area), **volumetric** (space of enclosure) or **traversed space of experience** (dynamic consideration between human beings and buildings) spaces (Uji, 1994). The first three types of space do not necessarily require human habitation but the traversed space of experience requires human interaction, performing one activity or another within the building in order to generate a user's perception of the space. The perception is heightened by the consciousness of the time and distance of the traverse.

The perception of space is traditionally believed to progress firstly from geographical or physically located space, secondly from operational space in which users relate or work, thirdly from perceptual space of symbolic meaning and finally from behavioural space which people experience and respond to (Hall, 1974; Rapoport, 1969; Oakley, 1970). This explains how man organises his activities and moves about in the world in which he lives. Buildings, the spaces within and around them and the relationships between them, are the cultural expression of these organisational patterns which are either fixed-feature spaces or semi-fixed feature spaces. Many cultures in the world incorporate fixed partitions or walls within in a building to define spaces for sleeping, eating, working or socialising. In others, partitions may be movable or non-existent allowing spaces to accommodate activities which change from one to another or from one user to another with relative ease (Forty, 2000). The latter scenario is common in the buildings found in most urban slum settlements in developing countries.

Most informal settlements develop in inner cities and the peripheral-urban communities close to cities and take on the characteristics of slums as the physical manifestation of several overlapping forces such as deep poverty, unrealistic regulatory frameworks, ill-conceived policies, inadequate urban planning, weak institutional capacity, and macroeconomic factors (The World Bank, 2008; The World Bank, 2016; Oyalowo, Nubi & Lawanson, 2018). Such slums become the dwelling for members of the informal economic sector which employs nearly 80% of the working population of low- and semi-skilled Nigerians (Lawanson, 2012). Informal sector participants rarely separate economic life from other aspects of social life such as culture, religion, kinship and lineage despite lingering urban poverty fuelled by low levels of social development. These include wide-scale public corruption, misallocation of funds, pitiable investment habits, poor family planning habits, minimum wage regulations and declining life expectancy.

In terms of layout and architectural character, Nigerian urban slums have not deviated much from their roots in pre-colonial architecture. Most African buildings (Nigerian buildings included) developed around forms, layout and methods of construction that were unique to the continent without being copies of any other surrounding culture (Cruikshank, 1999). Inhabitants who reside in urban slums resort to the use of low cost materials of construction such as local mud-bricks, timber, metal roofing sheets, plastic bags and hand-cut stones where they can be sourced locally (Figure 1). The use of updated materials of construction is usually restricted to finishing details such as ceramic floor tiles and fenestration. The absence of space standards for layout and character of urban slums embedded in local planning policy results in inadequate (overcrowded) spaces which have detrimental effects on the health and well-being of the residents (Blake, Kellerson & Simic, 2007; Crosby, 2015). Studies on space standards identify three measures of overcrowding as the persons-per-room (PPR), persons-per-bedroom (PPB) and unit-square-meter-per-person (USMPP).

Figure 1: Urban slum area in Mado community, Tudun Wada, Jos North, Plateau state, Nigeria (Source: Authors file)

3. Methodology

This study examines the living conditions of urban slum dwellers under the current restrictions of "social distancing" necessitated by the outbreak of a global viral pandemic. It also addresses the need for architecture to be used as a tool to revamp the current situation through proper design, maintenance and site planning. This section describes the methodology or general research strategy that outlines the way in which the research was undertaken and among other things, identifies the methods to be used in it. The method used for data gathering was case study, selected with a view to examining in great depth the extent of the characteristics being studied: in this case the individuals in informal urban settlements, which is more qualitative in nature. Evidence from the data collection is juxtaposed against the findings from reliable studies on the analysis of space in housing and urban development for the optimum requirements needed to curb the spread of contagious diseases (Blake, Kellerson & Simic, 2007; Crosby, 2015).

Data gathering strategies include individual (structured and non-structured) interviews among a focus group, content or documentary analysis, participant observation and archival research. The advantages of this method include data collection and analysis within the context of the phenomenon, integration of qualitative and quantitative data in data analysis and the ability to capture complexities of real-life situations so that the phenomenon can be studied in greater detail (Dudovskiy, 2018). The study area was selected through non-probability purposive sampling which is a sampling technique based on the characteristics of the limited number of respondents within the population in close proximity to the researcher who could serve as primary data sources within the delimitations and objectives of the study (Crossman, 2017). Through the use of personal interviews, documental research and physical observation, the case study findings are presented and analysed using photographs, narratives and descriptive interpretation.

3.1 Characteristics of the study area

The primary study area is situated in an informal settlement called Lohwol-Topp community, Rayfield of Jos South local government area of Plateau state, North Central Nigeria (Figure 2). Jos South is the located at 9°48'00"N and 8°52'00"E on 510km^2 of the Plateau highlands. Originally home to the Berom tribe, Jos South has settlers from all parts of the country and international community. The population of Jos South LGA according to the 2006 census estimates was 306,716 (Plateau State Government, 2019) of which nearly 80,000 people are believed to reside in Rayfield. The Lohwol-Topp area is home to 82 identifiable homesteads within the informal settlement areas with 1 (one) to 20 (twenty) residents per homestead, half of whom are indigent Berom local residents. For developmental purposes, Rayfield is classified as a low density residential area with many upscale houses or suburban homes of the middle- and upper-class residents interspersed by informal housing clusters on large, untenured land used for subsistence farming of grains and livestock such as poultry, goats and pigs. Most of the indigent and low-income residents of Lohwol-Topp are low- or semi-skilled workers who take on informal jobs such as domestic workers, artisans, small-scale retailers, fresh-produce market traders or farmers.

Figure 2: Aerial image of Lohwol-Topp community, Rayfield, Jos South LGA, Plateau state (source: Google Maps)

4. Results presentation and discussion

Cross examination of the current global issues and trends emerging from the need for social distancing and the spatial challenges in urban slum areas repeatedly draws attention to a few underlying themes surrounding the plight of the urban poor. A combination of factors – each driven by additional influences – appear as dynamics which affect the realisation of adequate social distancing measures to curb the spread of infectious diseases in informal settlements. Each of these main factors and their supporting influences will be discussed in this section of the study and conclusions on remediation strategies will be offered in the subsequent section. Findings from the primary study will be used to substantiate the discussions on the issues raised and recommendations that arise from the study. The 4 (four) main factors identified from the primary data are: overcrowding, multi-generation composition of homesteads, extreme poverty and unchecked mixed use of spaces.

4.1 Overcrowding

Overcrowding constitutes the most obvious challenge to social distancing in urban slum areas such as Lohwol-Topp. Key studies from the US and Great Britain (Blake, Kellerson & Simic, 2007; Crosby 2015) identify several parameters and considerations for overcrowding and space standards in homes with relevance to the prevalence of contagious diseases in overcrowded environments and the effect of household hazards on the well-being of the residents. A total of 14 (fourteen) family homesteads were observed in detail out of the 82 identifiable homesteads in the study area. These living spaces include shared spaces for cooking, sleeping and personal hygiene. From the overcrowding standards described on Table 1 below, the overcrowding condition of the 14 (fourteen) houses in the study area is presented on Table 2.

Table 1: Traditional standards of overcrowding in houses

Measure	Overcrowding standard
Person-Per-Room (PPR)	1 person per room
Person-Per-Bedroom (PPB)	2 persons per bedroom
Unit-Square-Metre-Per-Person (USMPP)	$15m^2$ per person
Persons-Per-Room-by-Unit-Square-Metre-Per-Person	Cross-tabulation of PPR and USMPP giving 1 person per $15m^2$

Benchmark criteria and definition for overcrowding (source: Adapted from Blake, Kellerson & Simic, 2007).

Table 2: Housing overcrowding condition in Lohwol-Topp, Rayfield

Residence	Tenure	Area (m^2)	No. of occupants	No. of rooms	PPR	USMPP (m^2)
LP I	owner	44.9	15	6	0.4	2.99
LP II	renters	22.2	4	4	1.0	5.55
RP I	owner	47.5	4	5	1.4	11.88
RP II	renters	86.8	12	6	0.5	7.23
GP	owner	17.8	1	1	1.0	17.80
SP I	owner	58.2	5	6	1.2	11.64
SP II	renters	51.0	6	4	0.7	8.50
SP III	owner	80.0	6	6	1.0	13.33
NP I	owner	41.8	3	2	0.7	13.93
NP II	owner	99.8	7	3	0.4	14.26
NP III	renters	16.0	3	2	0.7	5.33
AP I	owner	175.5	7	8	1.1	25.07
AP II	renters	82.0	9	10	1.1	9.11
ZP	owner	21.4	1	2	2.0	21.40

Derived PPR and USMPP values depicting housing conditions within Lohwol-Topp Rayfield area (source: author's field work)

In order to assess the "true" extent of overcrowding, a multi-vector measure of the results derived from the persons-per-room (PPR) and unit-square-metre-per-person (USMPP) were analysed for the demographic group and it was observed that overcrowding exists in all but 3 out of the 14 homesteads. It was also observed that the worst cases of overcrowding were experienced in houses that were rented. While home owners were more likely invested in ensuring the safety of their environments and community, renters were less invested in the community due to the instability caused by the lack of continuity in the home tenure of the renter. Thus, in the absence of adequate standard spaces for living, additional social distancing of 2m per person to curb the spread of diseases such as COVID-19 is not achievable in 11 out of 14 homesteads in the study area. Furthermore it was observed that social distancing was hampered due to the enforcement of extended lockdowns and stay-at-home orders which compelled all the residents of the homesteads (most of whom had staggered work patterns) to be indoors at the same time, worsening the overcrowding conditions. This was a general constraint to all the overcrowded homesteads in the study area which forced many residents to take refuge under trees and in make-shift outdoor seating spaces due to insufficient indoor activity space.

4.2 Multi-generation composition

Every pandemic comes at high risk to a certain demographic and early reports on the traits of those most affected by COVID-19 has identified the elderly and those with underlying health conditions as those most likely die from the disease. In many developed parts of the world, the elderly are looked after in nursing homes and hospices which make social distancing easier to implement in segregated communities. Observation of the study area shows that 9 out of the 14 homes (64%) have multi-generational occupants, 4 of which housed elderly people above the age of 65 years. This represents a shrinking demographic in the society based on the national life expectancy average. From Table 2, notably subjects SP I (PPR – 1.2, USMPP – 11.64m^2/P) and NP I (PPR – 0.7, USMPP – 13.93m^2/P) which are homesteads with residents up to the 3rd generation were equally determined to be below standards for overcrowding which poses an even greater risk to the senior residents of the homestead. Similar conditions of multi-generational homesteads are prevalent in developing countries such as Nigeria where the elderly live with and are cared for by younger members of the family who are often asymptomatic to diseases like COVID-19. For those living in urban slums such as the study area with low means of maintaining adequate social distance due to overcrowding, the risk factor to the health and wellness of the aged occupants increases significantly.

4.3 Extreme poverty

Poverty is a consequence of misfortune, limited individual capabilities and the structures or processes that determine the distribution of income. The visual aspects of poverty are very easy to assess in urban slums since they are associated with lack of basic amenities and services, ill health and malnutrition – all of which were observed in the study area (Figures 3 and 4). All of the homesteads observed were dependent upon working members of the family engaged in the informal sector of employment in which 12 of the 14 homesteads (85%) observed indicated heavy loss of income due to unemployment caused by the pandemic.

Figure 3: Low cost methods of construction using dried earth building bricks, rough-hewn wood supports, exterior finishing, underground cesspit, interior partitions (clockwise from top left).

Figure 4: Visual aspects of poverty in the settlement (top to bottom) – clustered homesteads and open refuse and sewage dumping (source: Authors field work).

The resultant loss of revenue has led to the indefinite suspension of all self-help infrastructural development which results in further deterioration of an already dilapidated environment. Materials and methods of construction in the study are also indicative of the level of poverty in the study area. Only 2 out of the 14 homesteads (14.3%) are constructed using updated materials such as cement, concrete, aluminium and modern sanitary wares. The remaining houses are predominantly constructed out of hand-made earth bricks with tin roofing sheets and inexpensive finishing details. Cooking and bathing rooms are typically make-shift or semi-permanent shared spaces observed within all the rented units accommodating multiple families. Shared amenities are more likely to be unhygienic and difficult to enforce strict sanitation rules which pose serious challenges to slowing the spread of infectious diseases.

4.4 Unchecked mixed using of residential spaces

The creation of environments that are of mixed uses is a primary aim of all urban planners to avoid the cyclical desertion of people and activity in parts of an urban area during specific times of the day or night. The composition of urban slums typical of the study area closely mimics the rural situation where familial and neighbourly ties foster security, comfort and contentment despite the squalid physical conditions. However urban planning strategies encourage the mix of uses without exploitation which often leads to environmental decay. Within the study area, it was observed that 9 of the 14 homesteads (64%) engage in mixed use practices which corroborate findings from related studies that the phenomenon is prevalent in most informal settlements in no clear pattern. Mixed uses within the study area are predominantly Home Based Enterprises (HBE's) which include livestock farming of pigs, goats and chickens; production and sale of a local alcoholic beverage (known as *burukutu*) made of fermented guinea corn or millet; food milling in a locally fabricated grinding apparatus (Figure 5); and braiding of hair.

Figure 5: Food milling using a local grinding apparatus in a roughly built shed within a homestead (source: Authors field work)

These self-help HBE's lack legal status and are established without form of access to credit from the formal financial sector. In the course of a pandemic, these unregistered HBE's affect the ability of residents in urban slums to maintain adequate social distances due to frequent contact with several random, external customers and clients who complicate the process of contact-tracing. The composition of the mixed uses in the study area also generate waste and refuse in the environment which makes it equally tasking to maintain the strict standards of hygiene in communal spaces required to curb the spread of infectious diseases such as COVID-19.

5. Conclusion and recommendation

The study examined the effect of overcrowding, homestead composition, poverty and unchecked mixed-using in an urban slum area on social distancing which is used as a control to the spread of infectious diseases during a pandemic. The study highlighted the complications which low income communities experience living in close, inadequate proximity amidst the threat of spread of high risk diseases. Though an effective way to curb disease spread, social distancing is not suited for all communities as revealed in the specific findings of the study. Given the stated challenges to space creation and utilisation in urban slums, the study therefore recommends firstly the establishment, documentation and refined assessment of local overcrowding standards by professionals in the built environment in order to determine the extent in domestic situations. This would enable the development of policies and schemes to address the condition and alleviate the discomfort of those living in informal settlements in urban areas. This is effort is particularly important for policymakers when determining how best to allocate limited resources to address overcrowding. The study also recommends the standardisation of buildings using low cost materials of construction for health and well-being which could include simple methods such as the use of standard fenestration to aid ventilation and improvement of disposal methods for sewage and refuse to curb the spread of diseases. Thirdly the study suggests the incorporation of possible isolation spaces in multi-generation homesteads for high risk residents in the layout of urban slum homesteads, particularly for sleeping and personal hygiene. This would go a long way in reducing the risk of infection to the vulnerable elderly and those with underlying medical conditions who often live in multi-generational homes typical in urban slums. Lastly the study recommends comprehensive documentation and monitoring of mixed use HBE's in urban slums which stimulate the informal economy but could hinder contact-tracing of random, frequent visitors and clients who easily spread contagious diseases in homesteads. The study would benefit from further research in other non-homogeneous communities in order to identify emerging trends and peculiarities in urban slums across different regions.

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