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Assessment of the Impacts of the COVID-19 induced lockdown on Household Capabilities in Minna, Niger State, Nigeria

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Abstract
The world is today challenged by the outbreak of the novel coronavirus (COVID-19) pandemic. The virus which causes respiratory illnesses spreads in humans through small droplets from an infected person's mouth and nose. As a way of containing its spread, some countries, Nigeria inclusive, activated/imposed the lockdown order (restrictive mass quarantine). This order however shut down among others, the primary, secondary and tertiary sectors of their economies. Consequently, the capabilities of households were affected due to disruptions in their income-generating capacities and food supply chain. This study, therefore, assessed the nexus between households' pre-lockdown income poverty and their capability-tolerance threshold during the lockdown in Minna, Niger State, Nigeria. In order to achieve this, the data collected were analysed using both the descriptive and linear regression techniques in Microsoft Excel and Statistical Package for Social Science (SPSS) environments. The outcomes of these were presented in simple graphics analysis (charts) and tables. The study revealed that the pre-lockdown household income poverty incidence of Minna, using the UN's poverty line of $1.90/day/capita was 92.5%, while that of the mean and median incomes were 57.1% and 76.2% respectively. The study similar indicated that the relationship between the pre-lockdown household income poverty and the capability-tolerance threshold of the lockdown period was statistically significant, with the former explaining 43.4% of the variation in the latter. The study thus recommended that deliberate programmes that support the growth and development of small and medium-scale enterprises should be put in place so as to expand households' income generating capacities and other livelihood capabilities. It was also recommended that households should be encouraged to entrench the saving culture and asset ownership (which serves as shock absorbers in times of crises).

Keywords: Impacts, COVID-19, lockdown, household, capabilities.

Introduction

The world is today challenged by the emergence and outbreak of the novel coronavirus (COVID-19) pandemic which was first reported on November 17, 2019 (the Guardian Newspaper, 2020). The virus according to Singhal (2020) originated in bats and was transmitted to humans through yet unknown intermediary animals in Wuhan, Hubei Province, China. Hence, the virus is zoonotic, that is, normally transmitted between humans and animals (Nigeria Centre for Disease Control (NCDC), 2020). The disease causes respiratory illnesses (Abu Bakar and Sofian, 2020), and manifests in form of difficulty in breathing, exhaustion, fever, cough, fatigue, body aches, loss of smell or taste, nausea and diarrhoea (NCDC, 2020; and WebMD.com, 2020). The global reported cases and deaths arising from the pandemic as at 12.13 GMT,

September 9, 2020, stood at 27,771,984 and 902,550 respectively (worldometers.info, 2020). Although much is yet unknown about the COVID-19 strain of the coronavirus (Gallagher, 2020; Cereceda, 2020; and Anderson *et al.*, 2020), it spreads between humans through small droplets from an infected person's mouth and nose (World Health Organisation (WHO), 2020).

In a study by Chinazzi *et al.*, (2020), the human-to-human transmission of COVID-19 was modelled using this compartmental representation: susceptible, latent, infectious, and removed stages. In the susceptible stage, individuals can acquire the virus through contacts with infectious persons, while in the latent stage (incubation period), individuals might not yet be able to transmit the infection. In the infectious stage, individuals can transmit the virus and eventually, they progress to the removed stage. Individuals in this stage are those who may no longer infect others because they are supposed to either be in isolation, hospitalized, have recovered, or have died. Hence, no one is safe from this virus (Oxfam, 2020). This disease, which also has a high infectious rate (Amzat *et al.*, 2020) has exposed the lack of resilience in the socio-economic, physical (environmental), and political structures of the urban system. Thus, slums and informal settlements, occupied by nearly 1 billion people globally (Buckley, 2020), are highly susceptible to the pandemic (Islam and Kibria, 2020). This is because physical interactions which negate the COVID-19 protocols are unalienable features of life in such settlements.

Usman (2019) asserted that humans, especially the poor, need to interact and leverage on their social ties in order to escape the pangs of hunger and poverty. Interactions are thus resilience-building mechanisms because households do derive financial and/or material benefits from them. Martins (2019) also argued that the urban poor enjoy a great deal of social capital which is anchored on interactions. But keeping to the containment measures of this virus (such as limited physical and social contacts) in the informal settlements is virtually impossible because they are characterized by cramped, often poorly ventilated dwellings housing large numbers of people, queuing to use shared toilets or draw water from wells or boreholes (Weston, 2020). Also, the protocols of the virus reeled out by authorities assume that households have adequate space, services, and social safety nets to survive such an order (Du *et al*., 2020) and these are non-existent in slums and informal settlements. This therefore makes the informal parts of the cities, the least prepared for the pandemic of COVID-19 and its associated problems (Corburn *et al*., 2020).

The implication of this is that such settlements can be fertile grounds for the spread of the virus because enforcing the necessary personal hygiene and public health behaviours to curb its spread, such as hand-washing and physical distancing, may be challenging if not impossible (Dahab *et al*., 2020 in Austrian *et al*., 2020). As a fall out from this, the slum dwellers are left with an unenviable dilemma of choosing between the prescribed containment measures and continuing with their daily activities, both of which have great risks of spreading the virus (Wasdani and Prasad, 2020; New Humanitarian, 2020). It is discernible from the foregoing that the outbreak of this pandemic poses more grave health dangers to the urban poor, and it has also more than ever before, exposed their vulnerability to the myriad of socio-economic and environmental challenges that have always confronted their lives and livelihood.

The outbreak of the pandemic necessitated the activation of the lockdown order (restrictive mass quarantine) by some countries (Abu Bakar and Sofian, 2020; Warren, 2020), Nigeria inclusive. This in effects meant the shutting down among others, of their primary, secondary and

tertiary sectors of the economy (Nicola *et al*., 2020). As a result of this, their revenues have plummeted leading to economic recession (Abu Bakar and Sofian, 2020), jobs losses and poor households becoming poorer (Smialek, 2020; TRT world.com, 2020). These, in the opinion of Onyekwena and Ekeruche (2020) have led to a dip in the consumption of non-essential commodities and income-generating capacities of households. To this end, this study assessed the pre-lockdown income poverty of households and its relationship with their capability-tolerance threshold during the lockdown in Minna, Niger State, Nigeria. The whole of Minna was however selected for the study because all its neighbourhoods have semblances of informality, even those that were conceived and developed according to some forms of planning standards and specifications.

Materials and Methods

Minna is the State capital of Niger State, Nigeria. Minna is located between 9 33' and 9 40' north and 6 29' and 6 35' east of the Greenwich Meridian (Figure 1). The settlement stretched along the city's main spine road, which divides the city into two sections: west and east. A 20-kilometer road runs from Chanchaga in the south to Maikunkele in the north. The West-East pattern stretched 15 kilometers from Gidan-Mangoro along the Bida axis in the west to Maitumbi to Gwada axis in the east. Minna is in a tropical climate zone with two seasons each year: rainy and dry. The rainy season, which lasts from May through October and includes the months of July and September, receives less than 1000 mm of yearly rainfall in the region. Between October and March, the dry season is in effect. Temperature varies within the region annually, with the dry season having low temperatures because the sun is at the southern hemisphere. Thus, minimum temperatures of below 30°C are recorded during the harmattan period, which is late December and January in the following year, and its maximum temperature often do not exceed 42°C. During the wet season, the sun moves northwards from the equator to the tropics of cancer. This results in high temperatures because the sun overheads at noon. This study covers all the 29 neighbourhoods in Minna, because all its neighbourhoods have semblances of informality, even those that were conceived and developed according to some forms of planning standards and specifications. This research exercise employed the use of both the primary and secondary sources of data. The primary data were collected through a set of questionnaires, while the secondary information was sourced from relevant literature which include theses, conference proceedings and journals. So also, the map and population figure of Minna were obtained from this source.

Sample Population

The 2019 projected population size of Minna, according to Martins (2019) was 539,213. The figure was projected from the 2006 National population census figure. Thus, using the 3.2% national population growth rate (National Population Commission - NPC, 2016), the projected 2020 population size of Minna is 556,468. This was calculated using the geometric growth formula shown in equation 1:

$$P_1 = P_0 (1 + r)^n \quad (1)$$

Where: P_0= the projected population;
P_1= base year population;
r = population growth rate;
^{n} = number of years/interval

Sample Size

This study is household-based and using the average household size of six for Niger State (NPC, 2011 in Martins, 2019), the estimated number of households in Minna, is 92,745. The survey system (2012) an online sample size calculator was used in obtaining the sample size of the study. The

sample size is 2,340 households at 2% pre-determined margin of error. Questionnaires for the study were proportionally administered on all the 29 neighbourhoods of Minna as delineated by Martins (2019). The sample size, estimated number of households and projected population figures of the neighbourhoods - calculated based on the 2019 estimated figures in Martins (2019) are shown in Table 1.

Table 1: Projected 2020 population figures of all the neighbourhoods in Minna

S/no.	Clusters	Projected Population	Estimated No. of Households	Sample Size	**S/no**	Clusters	Projected Population	Estimated No. of Households	Sample Size
1.	Angwan Daji	20,281	3,380	85	16.	Minna Central	35,999	6,000	151
2.	Barkin Sale	18,000	3,000	76	17.	Nasarawa	36,506	6,084	154
3.	Bosso Estate	5,577	930	23	18.	New GRA	1,014	169	4
4.	Bosso Town	53,492	8,915	225	19.	New Maitumbi	1,775	296	7
5.	Chanchaga	35,999	6,000	151	20.	Nykangbe	6,084	1,014	26
6.	D. Kura Gwari	12,422	2,070	52	21.	Sabon-Gari	45,886	7,648	193
7.	D. Kura Hausa	18,253	3,042	77	22.	Sauka Kahuta	9,634	1,606	41
8.	Fadikpe	6,084	1,014	26	23.	Shango	9,380	1,563	39
9.	F-Layout	6,591	1,099	28	24.	Talba Estate	761	127	3
10.	GRA	4,817	803	20	25.	Tayi Village	12,929	2,155	54
11.	Jikpan	11,915	1,986	50	26.	Tudun Fulani	14,450	2,408	61
12.	Kpakungu	23,831	3,972	100	27.	Tudun Wada North	31,943	5,324	134
13.	Limawa	37,013	6,169	156	28.	Tudun Wada South	28,901	4,817	122
14.	Maitumbi	19,014	3,169	80	29.	Tunga Low-Cost	5,577	930	23
15.	Makera	42,337	7,056	178		**Minna town**	**556,468**	**92,745**	**2,340**

Source: Calculated based on Martins (2019)

Sampling Technique

The study was conducted on the whole of Minna and the multistage sampling technique, made up of the clustered, stratified, and random sampling techniques, was employed for this purpose. Each of the 29 clusters of Minna (see Figure 1) was divided into strata using its respective streets. The allotted number of questionnaires for each cluster was thereafter proportionally administered on households in its respective strata with the aid of the random sampling technique. The research instrument was, for the purpose of ease of data collection and analysis, uploaded on to the 'KoBoCollect' App. This application is a mobile digital data collection tool used on Android, iOS, and many other devices.

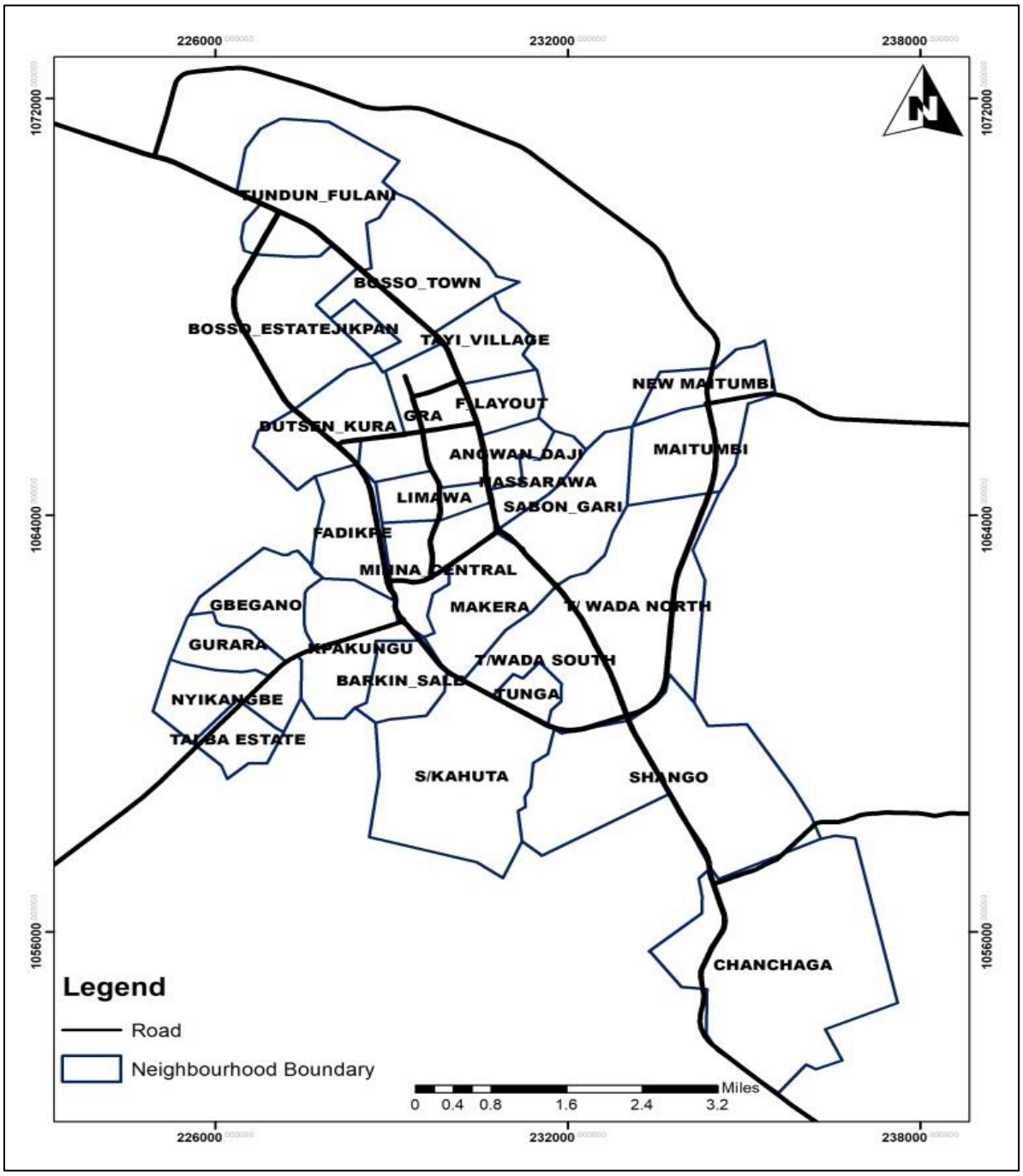

Figure 1: Neighbourhoods in Minna
Source: Martins (2019)

Methods of Data Analysis

The data collected were analysed using descriptive statistics and this was achieved through the robust deployment of the Microsoft Excel and the Statistical Package for Social Science (SPSS). The outcomes of these were presented in simple graphics analysis (charts) and tables. The poverty incidence of Minna was measured using the total monthly income of households. The poverty thresholds used in this assessment were the UN's (United Nations) $1.90 daily per capita income poverty line, as well as the mean and median incomes of Minna. The Naira equivalent of the UN's poverty line as at August, 2020 was ₦722.00. This was multiplied by the product of 30 (the average number of days in a month) and 6.6 (the average household size of Minna -

established by this study). The UN poverty line for households in Minna was therefore, ₦142,956.00, whereas the mean and median monthly incomes derived by this study were ₦99,677.00 and ₦72,500.00 respectively.

The question on the assessment of the capability-tolerance threshold was developed with the aid of a 5-scale Likert Table. It was thus close-ended, and each of the options (responses) had a weighted score. The weighted scores were in the multiples of five, starting from zero in an ascending order, that is, from the first to the fourth week of the lockdown. Hence, the inability of a household to tolerate the effects of the lockdown beyond its first week had a score of zero, while being able to tolerate it up to the second, third and fourth week had weighted scores of five, 10 and 15 respectively. In order to get the capability index values of the neighbourhoods, the frequency score of each option was multiplied by its weighted score. The outcome of this was divided by the product of the sample size of the neighbourhood and the maximum obtainable weight for the question (15). This procedure was performed for each option and their cumulative score gave the capability index of each neighbourhood. This method of index calculation was used in Usman (2019) to calculate the socio-environmental resilience of households in Bida, Niger State, Nigeria.

The linear regression analysis was on the other hand used to determine the nexus between pre-lockdown household income poverty and the capability-tolerance threshold during the lockdown period. This was done in order to establish the rate of change in the capability-tolerance threshold of households when household income poverty is varied. The composite headcount ratios of the neighbourhoods were loaded as the independent variables, while the capability-tolerance indices of the neighbourhoods were loaded as the dependent variables.

Results and Discussions

Households' pre-lockdown income poverty – A summary of the pre-lockdown household income data of Minna shown in Table 2 indicated that the minimum and maximum monthly household incomes were ₦4,500.00 and ₦675,000.00 respectively. A critical look at the Table also revealed that the mean and median monthly household incomes were respectively ₦99,677.00 and ₦72,500.00. The Table similarly showed that the mean monthly per capita income was ₦15,103, while the minimum and maximum monthly per capita incomes were ₦682.00 and ₦102,273.00 respectively. Data on the headcount ratio of the minimum and maximum monthly incomes are however not applicable; but according to the Table, the poverty incidence of the UN's poverty line was 92.5%, that of the mean income was 76.2%, while that of the median income was 57.1%.

Table 2: Descriptive statistics of households' pre-lockdown income

Category	Monthly Household income (₦.00)	Monthly income per capita (₦.00)	Daily income per capita (₦.00)	Headcount ratio (%)
Minimum	4,500	682	23	N/A
Maximum	675,000	102,273	3,409	N/A
Mean income	99,677	15,103	503	76.2
Median income	72,500	10,985	366	57.1
UN's poverty line	142,956	21,660	722	92.5
Composite	-	-	-	75.3

As a fall out from these high headcount ratios, the composite of the poverty incidences was also high at 75.3%. The implication of this was that most of the households in Minna were poor (particularly in the UN poverty threshold) and were ordinarily, not able to make ends meet without one form of support or the other. The collection of income data of the lockdown period was however not feasible because most of the respondents were unable to recollect the amount of money they made due to its non-steadiness. But all the respondents affirmed that with the imposition of the lockdown order on Minna, both the incidences and severity of poverty increased considerably as a result of the disruption of households' income-generating capacities.

Lockdown-induced capability-tolerance threshold

Households in Minna were on the strength of the data obtained, seriously affected by the COVID-19 induced lockdown. The data on this is illustrated in Figure 2. According to the Figure, 70% of the households stated that they felt the impact of the lockdown right from its first week of enforcement, while 18% and 12% opined that the impact became evident in the second and third week respectively. The implication of this is that there was not a single household in Minna that survived beyond the first three weeks of the lockdown without relying on one form of coping mechanism or the other. This in other words means that all the households in Minna were affected by the lockdown, but with varying degrees of tolerance thresholds. The households similarly averred that aside other inconveniences, the most pronounced effect of the lockdown was the disruption of their daily livelihoods (household income and food supply chain).

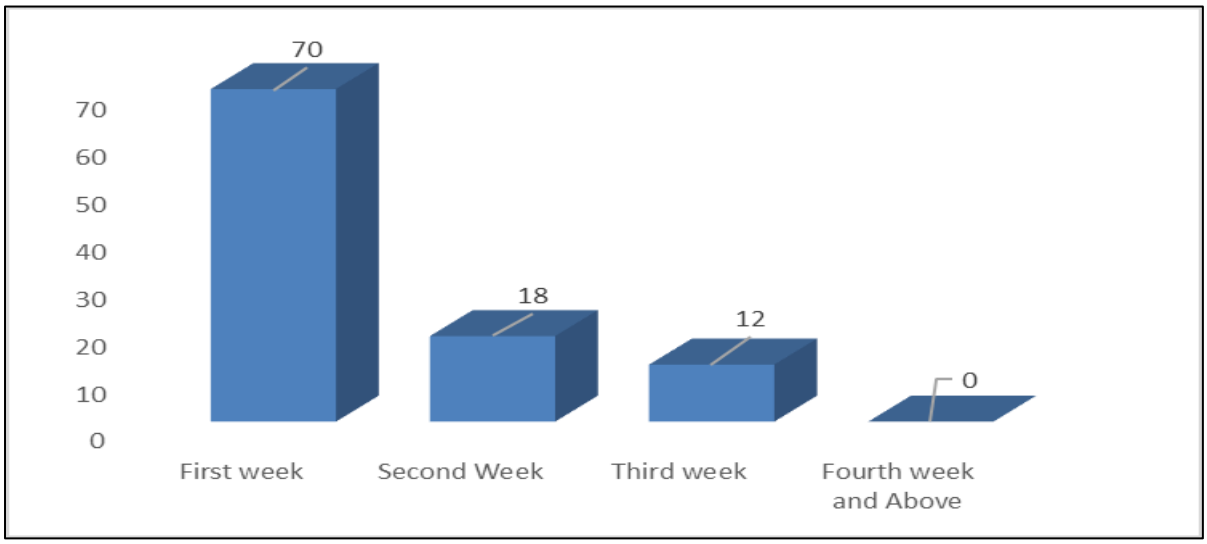

Figure 2: Lockdown-induced economic tolerance threshold (%)

Coping mechanisms adopted by households

In view of the enormity in the disruption of livelihood capabilities by the lockdown, households embraced some coping mechanisms, which according to them, were necessary for their survival during the period. The data obtained on this is shown in Table 3. As indicated in the Table, 5% of the households asserted that they had to fall back on their savings, 27% opined that they relied on their social

capitals, while 23% stated that they resorted to borrowing/buying food items on credit in order to escape the pangs of the lockdown-induced poverty. The Table similarly indicated that 12% of the households were supported by organisations (non-governmental and/or community-based) in enhancing their livelihood capabilities, 15% averred that they sold some of their priced assets while 10% revealed that they depended on government palliatives in enhancing their living conditions.

Table 3: Coping mechanisms adopted by households (%)

Coping mechanisms	Percentage
Savings	5
Social capital	27
Organisations	12
Government palliatives	10
Disposition of assets	15
Diversifying income sources	8
Borrowing/buying food items on credit	23

Households' perception of Governments' palliatives – Data on households' perception of the palliative programmes of both the Federal and State governments during the lockdown are presented in Figure 4. The analysis showed that 84% of the households opined that the palliative programmes were not properly executed (with 56% of these households expressing very strong reservations). However, this indicated that 16% of the households stated that the programmes performed averagely. Interestingly, none of the households stated that the programmes were effectively implemented. This in effects means that if the other livelihood enhancing capabilities (coping mechanisms) were not activated, most households in Minna would have moved into a non-preferred or adverse state of coping.

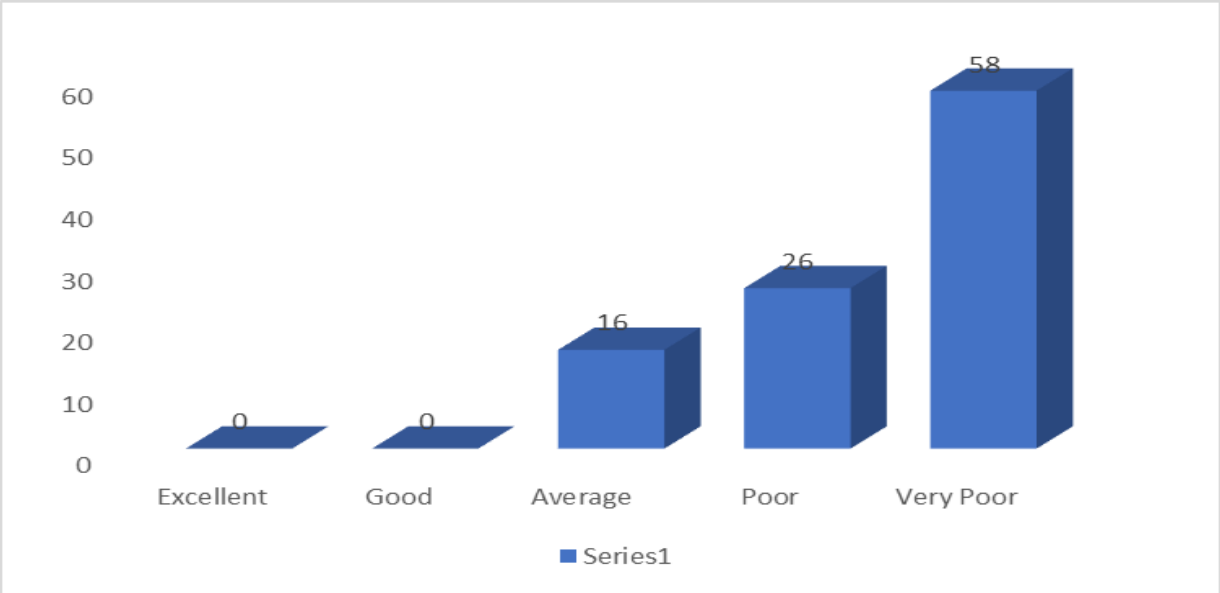

Figure 4: Households' perception of Government palliatives (%)

Nexus between the pre-lockdown household income poverty and the capability-tolerance threshold of the lockdown period

Variables of the composite of the pre-lockdown household income poverty and the capability-tolerance threshold of the lockdown period were loaded in order to determine the actual rate of change in the latter when the former is increased or decreased at a given rate. The variables loaded are presented in Table 4.

Table 4: Capability-tolerance threshold and income poverty variables

Capability threshold	Median income	Mean income	$1.90	Income composite
Dependent				Independent
0.075	47.1	78.8	94.1	73.3
0.160	43.4	71.1	97.4	70.6
0.258	47.8	56.5	73.9	59.4
0.171	65.3	84.0	96.0	81.8
0.115	57.6	91.4	100.0	83.0
0.136	44.2	84.6	100.0	75.6
0.116	40.3	76.6	98.1	69.3
0.028	57.7	76.9	90.9	76.9
0.256	21.4	39.3	96.2	39.3
0.193	15.0	35.0	57.1	35.0
0.135	56.0	84.0	55.0	79.3
0.131	79.0	89.0	98.0	89.3
0.073	81.4	92.9	100.0	91.5
0.040	68.8	95.0	100.0	87.9
0.122	55.6	80.9	100.0	78.3
0.195	58.9	86.8	100.0	81.9
0.204	76.0	89.0	100.0	88.3
0.667	0.0	0.0	75.0	25.0
0.048	71.4	85.7	100.0	85.7
0.125	73.1	84.6	100.0	85.9
0.199	54.9	73.1	89.6	72.5
0.053	78.0	92.7	100.0	90.2
0.180	46.2	64.1	92.3	67.5
0.333	66.7	66.7	100.0	77.8
0.124	59.3	74.1	83.3	72.2
0.216	85.2	91.8	100.0	92.3
0.198	74.6	92.5	100.0	89.1
0.079	82.8	94.3	100.0	92.3
0.197	47.8	78.3	87.0	71.0
0.163	**57.1**	**76.2**	**92.5**	**75.3**

The output of the linear regression presented in Table 5a revealed that the regression analysis recorded a correlation coefficient (R value) of 0.658879 and a coefficient of determination (R^2 value) of 0.434122. This implies that household income poverty explains 43.4% of the variation in the household capability crisis induced by the COVID-19 lockdown. The relationship between the variables is not only fair, it is also statistically significant as it recorded a p-value lower than 0.05 at 95% confidence level. The model for the regression analysis developed from the coefficient of the independent variable (Table 5b) is presented in equation 2.

Table 5a: Model summary

Model	R	R Square	Adjusted R Square	Standard Error
1	0.658879	0. 434122	0. 413163	0. 092014

Table 5b: Coefficient

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.517933	0.079096	6.548111	5.06E-07
Household income poverty	-0.00467	0.001026	-4.5512	0.000102

The model (equation 2) showed that the capability-tolerance threshold has inverse contributions to household income poverty. Therefore, the lower the households' capability-tolerance threshold, the higher the households' level of headcount income poverty. The implication of the relationship is that for each unit increase in the capability-tolerance threshold, headcount income poverty decreases with -0.00467 units.

$$Y_{Capability-Tolerance} = 0.517933 - 0.00467_{household\ income\ poverty} \quad \text{.....Eqn 2}$$

Conclusion and Recommendations

The outcome of this study has shown that the COVID-19 pre-lockdown income poverty was very high in Minna, and this was expected to have worsened as a result of the lockdown order occasioned by the disruptions in households' income-generating capacities. In view of this, all the households in Minna were affected by the lockdown order within its first three weeks of enforcement, with 70% of the households felling it right from its first week of enforcement. Furthermore, the study showed that a greater proportion of the households, that is, 27% depended on their social capital to make ends meet, while 26% and 58% of households believe that the implementation of palliative programmes of governments were respectively poor and very poor. The study similar revealed that household income poverty explained 43.4% of the variation in the livelihood crisis induced by the COVID-19 lockdown, while the relationship between the variables is fair and also statistically significant. The implication of this is that the higher the households' level of headcount income poverty, the lower the households' capability-tolerance threshold. As a result of the foregoing, the following recommendations have been put forward in order to improve the present state of affairs in the study area:

1. Deliberate programmes that support the growth and development of small and medium-scale enterprises should be put in place so as to expand households' income generating capacities and other livelihood capabilities;
2. Households should be encouraged in entrenching the saving culture and asset ownership because they serve as shock absorbers in crises periods;
3. Organisations (both governmental and non-governmental) should always ensure effective information dissemination in areas such as health and financial management. The purpose of which is to enhance household choices and capabilities.

References

Abu Bakar, N. & Sofian, R. (2020). Impact of corona disease 2019 (COVID-19) to equity market and currency exchange rate. IOSR Journal of Economics and Finance. 11(2) pp. 22-31

Amzat, J., Aminu, K., Kolo, V. I., Akinyele, A. A., Ogundairo, J. A., Danjibo, M. C. (2020). Coronavirus outbreak in Nigeria: Burden and socio-medical response during the first 100 days. *International Journal of Infectious Diseases* 98 (2020) pp. 218–224

Anderson, R. M., Heesterbeek, H., Klinkenberg, D. & Hollingsworth T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*. 395(10228), pp. 931-934.

Austrian, K., Pinchoff, J. Tidwell, J. B., White, C., Abuya, T., Kangwana, B., Ochako, R., Wanyungu, J., Muluve, E., Mbushi, F., Mwanga, D., Nzioki, M., & Ngo, T.D. (2020). COVID-19 related knowledge, attitudes, practices and needs of households in informal settlements in Nairobi, Kenya. *Bull World Health Organ*. E-pub: 6 April 2020. doi: http://dx.doi.org/10.2471/BLT.20.260281

Buckley, R. M. (2020). Targeting the world's slums as fat tails in the

distribution of COVID-19 cases. *Journal of Urban Health*. 2020 Jun 2: pp. 1–7. doi: 10.1007/s11524-020-00450-w

Cereceda, R (2020). What we know and don't know about the Covid-19 coronavirus. Available online at https://www.euronews.com/2020/03/27/what-we-know-and-don-t-know-about-the-covid-19-coronavirus [accessed June 2, 2020]

Corburn, J., Vlahov, D., Mberu, B., Riley, L., Caiaffa, W. T., Rashid, S. F., Ko, A., Patel, S., Jukur, S., Martinez-Herrera, E., Jayasinghe, S., Agarwal, S., Nguendo-Yongsi, B., Weru, J., Ouma, S., Edmundo, K., Oni, T., & Ayad, H. (2020). Slum health: Arresting COVID-19 and improving well-being in urban informal settlements. *Journal of Urban Health* (2020). DOI https://doi.org/10.1007/s11524-020-00438-6

Chinazzi, M., Davis, J. T., Ajelli, M., Gioannini, C. Litvinova, M., Merler, S., Piontti, A. P., Mu, K., Rossi, L., Sun, K., Viboud, C., Xiong, X., Yu, H., Halloran, M. E., Longini Jr, I. M., & Vespignani, A. (2020). The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science*. 368 (6489), pp. 395-400. DOI: 10.1126/science.aba9757.

Du, J., King, R. & Chanchani, R. (2020). Tackling inequality in cities is essential for fighting COVID-19. Available online at https://www.wri.org/blog/2020/04/coronavirus-inequality-cities [accessed June 2, 2020]

Gallagher, J. (2020). Coronavirus: what we still don't know about Covid-19. Available online at https://www.bbc.com/news/health-52006988 [accessed June 2, 2020]

Islam, T. and Kibria, M. G (2020). Challenges to the prevention of COVID-19 spread in slums of Bangladesh. *Journal of Public Health*, 42 (3), pp. 637-638

Martins, V. I. (2019). Types and role of social capital in livelihood improvement in Minna, Nigeria**.** PhD thesis, Department of Urban and Regional Planning, Federal University of Technology, Minna, Nigeria

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*. 2020 Jun; 78, pp. 185–193.

National Population Commission (NPC) (2016). Nigeria's over 167 million population: Implications and challenges. Available online at www.population.gov.ng/index.php/84-news/latest/106-nigeria-over-167-million-population-implications-and-challenges [accessed December 12, 2017]

Nigeria Centre for Disease Control (NCDC, 2020). Frequently asked questions on Coronavirus - 15/03/2020. Available online at https://ncdc.gov.ng/news/item/241/?t=frequently-asked-questions-on-coronavirus---15%2F03%2F2020 [accessed 2 June 2020]

Onyekwena, C. and Ekeruche, M. A. (2020). Understanding the impact of the COVID-19 outbreak on the Nigerian economy. Available online at https://www.brookings.edu/blog/africa-in-focus/2020/04/08/understanding-the-impact-of-the-covid-19-outbreak-on-the-nigerian-economy/ [accessed September 8, 2020]

Oxfam (2020). No one is safe from coronavirus until everyone is: Oxfam Coronavirus Response Report, June 2020. Available online at

https://reliefweb.int/report/world/no-one-safe-coronavirus-until-everyone-oxfam-coronavirus-response-report-june-2020 [accessed September 11, 2020]

Singhal, T. (2020). A review of coronavirus disease-2019 (COVID-19). *Indian Journal of Paediatrics*. 87(4): 281–286.

Smialek, J. (2020). Poor Americans hit hardest by job losses amid lockdowns. Available online at https://www.nytimes.com/2020/05/14/business/economy/coronavirus-jobless-unemployment.html [accessed June 2, 2020]

The Guardian newspaper (2020). First Covid-19 case happened in November, China government records show – report. Available online at https://www.theguardian.com/world/2020/mar/13/first-covid-19-case-happened-in-november-china-government-records-show-report [accessed June 2, 2020]

The New Humanitarian (2020). Coronavirus in the city: A Q&A on the catastrophe confronting the urban poor. Available online at https://www.thenewhumanitarian.org/interview/2020/04/01/coronavirus-cities-urban-poor [accessed August 16, 2020]

The survey system.com (2012). Sample size calculator. Available online at https://www.surveysystem.com/sscalc.htm [accessed August 26, 2020]

TRT world.com, (2020). Coronavirus hits jobs, millions face unemployment and poverty. available online at https://www.trtworld.com/magazine/coronavirus-hits-jobs-millions-face-unemployment-and-poverty-35294 [accessed June 2, 2020]

Usman, M. Y. (2019). Analysis of household poverty and resilience in Bida, Niger State, Nigeria, PhD thesis, Department of Urban and Regional Planning, Federal University of Technology, Minna, Nigeria

Wasdani, K. P. and Prasad, A. (2020). The impossibility of social distancing among the urban poor: The case study of Indian slum in the times of COVID-19. *Local Environment.* 25(5) pp. 414-418. DOI: 10.1080/13549839.2020.1754375

Warren, K. (2020). Countries that are on lockdown because of coronavirus. Available online at https://www.pulse.ng/bi/lifestyle/countries-that-are-on-lockdown-because-of-coronavirus /f28yp94 [accessed June 2, 2020]

WebMD.com (2020). Coronavirus and COVID-19: What you should know. Available online at https://www.webmd.com/lung/coronavirus [accessed June 2, 2020]

Weston, M. (2020). How to tackle coronavirus in slums. Available online at https://www.globaldashboard.org/2020/03/27/how-to-tackle-coronavirus-in-slums/ [accessed June 2, 2020]

WHO.com (2020). Q&A on coronaviruses (COVID-19). Available online at https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-coronaviruses [accessed June 2, 2020]

Worldometers.info (2020). Covid-19 Coronavirus Pandemic. Available online at https://www.worldometers.info/coronavirus/ [accessed September 9, 2020]