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Covid-19 Lockdown and the 'Work-From-Home' Approach: Effect on Nigerian Academics

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Abstract

This article investigates the effect of the Covid-19 lockdown and the 'work-from-home' approach on academic activities in Nigeria, using bivariate and multivariable regression. The results show that factors such as inadequate power supply, electricity access, workspace and access to research materials, health status and care for children and the elderly during the Covid-19 lockdown were significantly associated with a decline in the time devoted to academic work. On the other hand, virtual teaching or learning and the ability to work from home more often had positive and statistically significant effects on weekly work hours. The study also finds that Covid-19 lockdowns had a stronger negative effect on female researchers than their male counterparts. The implication is that a prolonged lockdown will harm the education system in Nigeria by negatively affecting research outcomes in terms of weekly work hours. Thus, the recommendations emanating from the findings are discussed in the article.

Keywords: Covid-19; lockdown; 'work from home'; academics; Nigeria

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Résumé

Par une régression bivariée et multivariée, cet article examine l'effet du confinement provoqué par le Covid-19 et de l'approche « télétravail » sur les activités d'universitaires au Nigeria. Les résultats montrent que des facteurs tels que la fourniture inadéquate d'électricité, l'accès à l'électricité, la disponibilité d'un espace de travail et l'accès aux matériaux de recherche, l'état de santé et la fourniture de soins aux enfants et aux personnes âgées pendant le confinement ont été significativement associés à une baisse du temps consacré au travail universitaire. En revanche, l'enseignement ou l'apprentissage virtuel et la possibilité de travailler à domicile ont eu des effets positifs et statistiquement significatifs sur les heures de travail hebdomadaire. L'étude révèle également que les blocages dus au Covid-19 ont eu plus d'effets négatifs sur les chercheuses que sur leurs homologues masculins. Cela induit qu'un confinement prolongé nuira au système éducatif nigérian en impactant négativement les résultats de recherche en termes d'heures de travail hebdomadaire. Ainsi, les recommandations émanant de ces résultats sont discutées dans l'article.

Mots-clés : Covid-19 ; confinement ; « travailler à domicile » ; universitaires ; Nigeria

Introduction

Covid-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The mild symptoms include fever, dry cough, body pain, diarrhoea, fatigue and shortness of breath, while the severe symptoms are pneumonia, acute respiratory distress syndrome, sepsis and septic shock, which can cause death (Delivorias and Scholz 2020). The average incubation period is between two to fourteen days. The disease, which has a high rate of transmission (mostly through respiratory droplets), started in Wuhan, China and was first reported in December 2019. More than 1,800 people died and over 70,000 individuals were infected within the first fifty days of its emergence in the country (Shereen *et al.* 2020). Initially, the outbreak was declared by the World Health Organization (WHO) as endemic because of its spread in China and other neighbouring countries. However, on 11 March 2020, the disease was declared a pandemic by the WHO due to its global spread to all the continents of the world.

Covid-19 is one of numerous diseases revealed to be a pandemic because it spread rapidly from its original outbreak. Developed countries, especially in Europe, have been the most affected. On 14 June 2020, the United States of America (USA), Brazil and Russia were reported to be the most highly

infected countries in the world (VOA News 2020). Specifically, the USA was the most affected, with over two million confirmed cases and almost 200,000 deaths. The second most-affected country was Brazil, where over 850,000 cases and over 43,000 deaths were confirmed. Russia, the third most-affected country, had more than 530,000 confirmed cases and over 7,000 deaths. Globally, by 28 June 2020, about nine million individuals had been affected and there were over 500,000 deaths (BBC News 2020). Consequently, almost all the affected countries in the world ordered their citizens to stay at home to reduce the spread of the disease. As a result, most organisations ordered their employees to work from home, while only essential workers allowed at their workplace.

Africa as a continent was not immune to the outbreak. Notably, African countries started recording cases of Covid-19 in February 2020, with the first case reported in Egypt. In Nigeria, the first case of Covid-19 was reported on 27 February when an Italian who worked in Nigeria came into the country from Milan where the number of cases was reportedly high. In response to an increasing rate of infections in Nigeria, the government, through the Presidential Task Force on Covid-19, enforced the 'stay-at-home' directive to flatten the curve of the disease and reduce its spread. In addition, the government, through the Federal Ministry of Education and National University Commission, took the precautionary move to curtail the spread of Covid-19 by ordering the immediate closure of all educational institutions—primary, secondary and tertiary—on 26 March 2020.

Even with these measures, the number of cases continued to increase. By 14 June 2020, the Nigerian Centre for Disease Control (NCDC) reported that the number of confirmed cases was 15,682, 5,101 people had recovered from the disease and 407 were dead due to the disease. At the time of writing this paper, the country was still under partial lockdown and this was affecting the economy adversely. To mitigate the effect of the lockdown on the economy, many organisations introduced 'work from home' to reduce face-to-face contact in the workplace to avoid human suffering and the loss of lives while maintaining productivity, according to Delivorias and Scholz (2020).

Academics and researchers were not excluded, since all schools closed down. Some schools set up virtual learning, while others were not involved in virtual learning. According to Okocha (2020), 'poor Internet infrastructure and a lack of reliable electricity supplies' (2020:1) were the major reasons why Nigerian institutions battled with online learning. This also affected—either positively or negatively—lecturers' productivity when it came to writing article(s) for publication or personal development

in the area of specialisation. This implies that Covid-19 affected not only education but also academic and research activities across the world. The major question this present study intends to address is what has been the impact of the Covid-19 lockdowns and 'work-from-home' approach on academic activities in Nigeria?

Delving into the empirics, the answer to this question is far from being settled. For instance, Staniscuaski *et al*. (2020) reported that while many researchers had more time for their research activities, since they were not involved in teaching and administrative tasks, researchers who were parents of young children were faced with greater parental responsibility due to the closure of schools (see also Than 2020). Also, Staniscuaski *et al*. believed that the work of taking care of their children fell more to academic mothers than academic fathers, and as a result they became more involved in schooling their children and doing household chores than writing academic papers. Their findings show that Covid-19 negatively affected academic mothers more than academic fathers in writing scholarly papers. In the same vein, Than (2020:1), using Stanford University and other universities globally, argued in an online article that:

> Covid-19 has hampered not only education but academic research as well. Engineers and scientists are cut off from their labs and equipment. Crucial experiments have been disrupted. Field researchers and social and clinician scientists are unable to travel or work with human subjects. Even theoreticians and humanities scholars, who can presumably perform much of their work remotely, are feeling the repercussions of the pandemic due to the lack of in-person collaborations and access to collections.

Similarly, Guzman *et al*. (2020) confirm that conducting community-based research in developing countries was difficult during the pandemic period, due to the high person-to-person infection patterns of Covid-19. To those authors, Covid-19 threatened the success of continued face-to-face research. In addition, many conferences, workshops and seminars were either delayed or cancelled due to the SARS-CoV-2. This is confirmed by Gallo and Trompetto (2020). Those events that were not cancelled were done via online webinars, which not everyone was able to attend due to the lack of Internet services or poor power supply.

In the same vein, Cui *et al*. (2020) examined the gender dimension of academic research productivity in social sciences in response to the Covid-19 pandemic shock among different university scholars in the world. The authors collected data from 41,858 papers written by 76,832 authors and submitted on the Social Science Research Network from twenty-five

countries. The authors divided the sample periods into pre-Covid-19 and during the Covid-19 pandemic period to examine the variations in research productivity across gender. Their study reveals that within the first ten weeks of the pandemic in the US, research output by female scholars reduced by 13.9 per cent in comparison to their male counterparts. In addition, the authors replicate the analysis for other countries and find a significant reduction in the research productivity of female researchers during the lockdown period in twenty-one countries out of the twenty-five countries they examined.

Generally speaking, Covid-19 had a negative effect on education, with 'learning disruptions and decreased access to education and research facilities, job losses and increased student debts', as argued by Onyema *et al*. (2020:1). To add to this, the survey report of Ogunode (2020) shows that Covid-19 would drastically affect international grants and national funding for research activities of higher institutions in Abuja, Nigeria, thus reducing the research outcomes in these institutions in Abuja. Iwu *et al*. (2020) examined the experiences of academics working from home during Covid-19 in South Africa. They found that working from home was a discouraging task for academics, necessitating extensive organisational, personal and social adjustments. Based on the effect of the disruptions of Covid-19 on female researchers, Myers *et al*. (2020) revealed that Covid-19 did not affect all scientists equally. Female scientists, those in the 'bench sciences' and, especially, scientists with young children, experienced a substantial decline in time available to devote to research.

In examining the positive effect of Covid-19 on academic research, Wigginton *et al*. (2020) posited that during this time academic researchers studied different aspects of the social, economic and behavioural effects of Covid-19. As a result, they were able to develop causes, tests, therapies and vaccines that would aid treatment and prevent the transmission of the disease. According to the authors, by 19 May 2020 more than 13,700 papers on Covid-19 (Chen *et al*. 2020) had been published across the world and more than 3,700 pre-prints had been posted to the bioRxiv and medRxiv repositories. This narrative shows that many academic papers were produced, especially in the field of science. To add to this, Hussein *et al*. (2021) investigated the impact of Covid-19 on academic community sustainability in Iraq with the findings that Covid-19 encouraged the acquisition of technical skills, promoted self-development and offered an opportunity for researchers to attend electronic scientific discussions virtually.

Meanwhile, on 18 March 2020, a researcher named Marinkovic asked a question on ResearchGate, a research outlet: 'What is the impact of Covid-19 on your research/academic activities?' Mostly, the responses confirmed that Covid-19 was negatively affecting their research activities due to the following reasons: psychological trauma, parental responsibilities (especially among academic mothers), lack of access to technology, erratic power supply and unstable Internet services, among others. Some respondents viewed the pandemic period as a period for writing manuscripts for publication, particularly for those who already had sufficient data for publication. Some respondents advised researchers to change the methodology they were using for their academic papers. For instance, they could change from field-based surveys to online surveys (using Google online forms), or telephone interviews, for those who were involved with primary data. The belief was that all these would positively influence their research activities.

Along the same lines, a survey on the 'Covid-19 Impact on Global Scientific Community' was carried out by ResearchGate in March 2020. Some 3,000 international researchers responded within twenty-four hours. The responses showed that 82 per cent of respondents had their work affected by the pandemic; 67 per cent worked from home; 45 per cent now had more time to search for and read scientific literature; 43 per cent spent more time writing and submitting papers, doing peer review and collaborating with other scientists; 46 per cent were spending more time in keeping up to date with other scientific institutions and looking for new career opportunities; and 68 per cent were spending much less time attending research-related events (conferences).

Overall, the pandemic seemed to cause more harm than good (Shretta 2020), affecting economic and social activities globally. It forced most people to work from home (including academic researchers). On one hand, some researchers believed that they were more productive on campus as a result of motivation, access to Internet and electricity facilities and the lack of disturbance from home activities, which included caring for their children (for those with young children), doing house chores (with respect to academic mothers) and so on. On the other hand, some found that they were productive while working from home because they were not distracted by school activities. It is on this note that this present study sets out to examine whether working from home due to Covid-19 increased productivity among academic researchers in Nigeria. The study is also necessitated by the importance of research to nation-building and in coming up with solutions to the ravaging pandemic.

The remaining part of this study is organised as follows. Section 2 focuses on the methodology adopted in this study. Section 3 discusses the findings. Section 4 presents the concluding remarks with some recommendations that emanated from the findings.

Methodology and Data

This is a cross-sectional study that explores the effects of the Covid-19 lockdown approach on the research activities of academics in Nigerian institutions in order to describe the prevailing effect of the lockdown on research activities. The population of the study constitutes academics in Nigerian universities, polytechnics and colleges of education. With an estimated population of over 66,000 (*Trading Economics* 2020), a minimum sample size of 100 was arrived at using equation 1, wherein a 10 per cent precision level (e) was applied with a confidence interval of 95 per cent (Yamane1967, as cited in Glenn 1992):

$$n = N \Big/ 1 + N(e)^2$$

The survey instrument (questionnaire) was developed on Google Forms and was distributed via email and social media platforms for members of higher institutions and professional networks. A pilot survey was conducted to test the understanding of the questions and language clarity, and the final survey was collected during the peak period of Covid-19 restrictions by federal and state governments (May–June 2020). Although there was national strike action by the Academic Staff Union of Universities (ASUU) during the same period, our study could still gather data on the effect of Covid-19 restrictions because the strike action did not affect all Nigerian universities and it did not restrict the movement or access to research and academic facilities of all academics.

To ensure that the respondents were Nigerians and academic staff of higher institutions, the questionnaire inquired about their country of residence and whether or not they worked as academics in higher institutions. The questionnaire also addressed the sociodemographic characteristics of respondents, and their economic as well as academic activities during and before the lockdowns induced by Covid-19. Responses on perceived research productivity were obtained using a Likert scale of one to five, ranging from the ability to research as usual to the inability to carry out research. Factors strengthening inability were also captured to buttress the discourse.

A multistage random sampling approach was used to obtain a total of 141 samples, which had twenty-six invalid and 115 valid responses. Informed consent was given by all participants before submitting the forms. The analysis was conducted to describe the background information of respondents across gender, and the chi-square test was conducted to determine the association between the variations in work hours and explanatory variables. Multivariable regression was also conducted to establish the association between the outcome and explanatory variables, after considering their statistical level of significance.

The outcome variable for this study is the amount of time spent on research activities during the Covid-19 lockdown. This study focuses on the individual's research work hours due to the general lack of consensus on and the complex nature of measuring academic productivity using the input and output approach (Altbach 2015). Academics of various levels responded to the question on the average number of hours spent weekly, and count data approaches, Poisson regression and negative binomial regression were used in the analysis. Both regressions were employed because, unlike the Poisson regression, the negative binomial regression corrects for overdispersion of data where the conditional mean is smaller than the variance.

Motivated by prior empirical studies, such as Feng and Savani (2020), Myers *et al.* (2020), Staniscuaski *et al.* (2020) and Iwu *et al.* (2022), personal, technological and organisational factors were considered as dependent variables. For personal factors, information on sociodemographic characteristics, such as age, gender, education, academic cadre and family size, were elicited from respondents due to their general moderating effect on work hours. The technological factors used include Internet availability and electricity access, which otherwise would have been provided by universities in the absence of a lockdown. The organisational factors considered were access to research materials and general workspace conditions during the lockdown. In addition, the study controlled for self-rated health conditions during the same period given the theoretical relationship between health and productivity.

In this study, the age of the respondents was categorised into two groups—below forty years and above forty years. Although age is expected to have a negative effect because productivity generally declines with age, its impact on work hours during the pandemic is less clear. For gender, females are expected to be disproportionately affected given their need to provide care at various levels. Household size was categorised into two groups—five members, and above five members, following the national average household size of 5.1 (Statista 2019).

Since academics are expected to have a minimum of a Bachelor's degree, education was categorised dichotomously using the highest level of education obtained (those who do not possess a doctorate degree and those who possess a doctorate), while information on their sector of residence (rural or urban) was also documented.

Given the peculiarity of the Covid-19 pandemic, some institutions immediately commenced online teaching and examination for students whereas others did not. Participants were therefore asked if they were involved in virtual teaching or learning during this period because of its potential effect on working hours. Additionally, the ability to work from home was documented by the respondents on a scale of one to five, recategorised as 'occasionally' and 'often'. Other factors, such as electricity supply, Internet facility, workspace condition, the need to care for children or elderly household members and self-rated health status were included in the model as dummies. Prior to the interpretation of the result, a multicollinearity test was conducted using the variance inflation factors (VIF) and the data was analysed using STATA 16.1 (StataCorp 2020).

Results

The background information of the respondents presented in Table 1 shows that most of the participants were between the ages of thirty-nine and fifty-nine years, with more males than females, and a higher percentage (over 60 per cent) had a doctorate. Their household characteristics suggest that about two-thirds lived in households consisting of two to five members and over 90 per cent of the male respondents were household heads in contrast to the female respondents. The majority (83 per cent and 82 percent) resided in urban sectors and outside the university community, respectively. Besides, 66 per cent of the respondents worked at federal universities and a higher percentage of the participants (68 per cent) were mid-level academic staff.

Figure 1 presents the variations in the time allocated to work during and before the Covid-19 lockdown. In Figure 1a, the results suggest some changes in the self-rated performance of academics prior to and during Covid-19 lockdown, with a marginal drop in the self-rated performance from two to four and an increase in the lower scale (one and two). Meanwhile, 14 per cent rated their performance as very high before and during the pandemic-induced lockdown. Figure 1b suggests variations in the weekly working hours during the lockdown across gender. The share of time put in to work weekly for males was extended more positively, with a mean of twenty-six hours in comparison to the mean of seventeen hours reported by females. Marginal changes were

observed in the share of time allocated for research and supervision, with a higher percentage of respondents (over 40 per cent) experiencing a 25 per cent decline, but no remarkable change in conference participation and research funding during the lockdown. However, some respondents generally experienced changes that ranged from a 100 per cent decline to improvements.

Using the chi-square test of association, Table 2 presents the variations in the share of time allocated to work and their associated factors. The findings suggest that there is no association between age and changes in the share of time allotted to work during the pandemic lockdown. Gender also had no significant association, even though a higher percentage of females (42 per cent) reported a decline in the share of time devoted to work in comparison to male academics (22 per cent). Household size and the highest level of education also showed no significant association with variations in the share of time devoted to work during the Covid-19 lockdown. Other factors, such as inadequate power supply, electricity access, workspace, access to research materials and care for children and the elderly during the Covid-19 lockdown, were significantly associated with a decline in the share of time devoted to work during the pandemic.

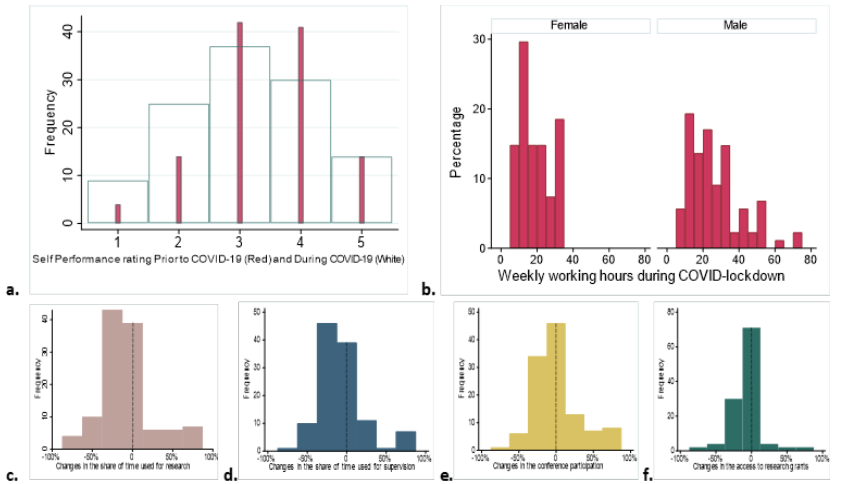
The findings from the Poisson regression and the negative binomial regression presented in Table 3 are largely similar. However, this study focuses on the negative binomial regression result because the Pearson goodness-of-fit results indicate that the distribution of the number of hours devoted to work significantly differs for a Poisson distribution using the p-value of less than 0.001 (which is below the standard threshold of 0.05). Furthermore, the likelihood-ratio test of alpha is equal to 0, the chibar2 (01) and the Prob>=chibar2, which is equal to 270.34 and 0.000 respectively, which suggests that the dispersion parameter is equal to zero while the outcome variable is over dispersed and is not sufficiently described by the simpler Poisson distribution—hence, the need to report the negative binomial regression rather than just the result from the Poisson distribution.

The coefficients reported suggest that gender significantly influenced the number of hours devoted to work weekly during Covid-19. That is, holding other variables constant in the model, males devoted more time to work weekly compared with females (IRR =1.20, P<0.01) during the lockdown. Virtual teaching or learning during this period also had a positive and statistically significant effect on the weekly working hours (IRR =1.70, P<0.01). The ability to work from home often (IRR =1.20, P<0.05) also had a positive and statistically significant effect on the weekly hours devoted

to work during the lockdown. While having a poor health status during this period had a negative and statistically significant effect on the weekly hours of work, other control variables, such as age, household size, level of education, etc., had no effect on the number of hours worked weekly during the Covid-19 lockdown.

Table 1: Background Information of Respondents

VARIABLES		MEN (77%)		WOMEN (23%)		TOTAL	
Individual characteristics							
Age (in years)	18–39 years	32	36.36	13	48.15	45	39.13
	39–59 years	52	59.09	13	48.15	65	56.52
	≥ 60 years	4	4.55	1	3.7	5	4.35
Education	Bachelor's degree	4	4.55	1	3.7	5	4.35
	Master's degree	31	35.23	9	33.33	40	34.78
	Doctorate degree	53	60.23	17	62.96	70	60.87
Household characteristics							
Household size	0–1	8	9.09	0	0	8	6.96
	2–5	54	61.36	22	81.48	76	66.09
	6	26	29.55	5	18.52	31	26.96
Household head	No	3	3.41	26	96.3	29	25.22
	Yes	85	96.59	1	3.7	86	74.78
Sector	Rural	8	9.09	5	18.52	13	11.3
	Urban	75	85.23	21	77.78	96	83.48
	Uncertain	5	5.68	1	3.7	6	5.22
Residence (within the institution)	No	72	81.82	22	81.48	94	81.74
	Yes	16	18.18	5	18.52	21	18.26
Academic characteristics							
Type	Federal	60	68.18	16	59.26	76	66.09
	State	15	17.05	5	18.52	20	17.39



	Private/Non-Governmental	13	14.78	6	21.59	19	16.52
Rank	Junior	14	15.91	9	33.33	23	20
	Mid-level	63	71.59	15	55.56	78	67.83
	Senior	11	12.5	3	11.11	14	12.17

Figures 1a–f: Changes in the allocation of work time

Note: Figure 1a—Self-performance rating on a scale of 1 through 5 pre-Covid-19 pandemic and during the Covid-19 pandemic lockdown. Figure 1b—Average number of hours spent on work weekly during the Covid-19 lockdown by gender. Figure 1c, 1d and 1e—The distribution of percentage changes in the share of time spent on research (c), supervision (d) and conference attendance (e) respectively. Figure 1f—The distribution of percentage changes in the access to research funds/grants.

Table 2: Variations in the share of time devoted to work and the associated factors

CHARACTERISTICS		DE-CLINE	CON-STANT	IN-CREASE	CHI-SQUARE (P-VALUE)
Age	18-39	0 (0)	31 (68.89)	14 (31.11)	$\chi^2 = 8.17$ (0.12)
	40-59	4 (6.15)	36 (55.38)	25 (38.46)	
	60 and above	0 (0)	1 (20)	4 (80)	
Gender	Female	1 (3.7)	20 (74.07)	6 (22.22)	$\chi^2 = 3.51$ (0.17)
	Male	3 (3.41)	48 (54.55)	37 (42.05)	
Household size	0-1	0 (0)	5 (62.5)	3 (37.5)	$\chi^2 = 2.35$ (0.67)
	2-5	4 (5.26)	43 (56.58)	29 (38.16)	
	6-9	0 (0)	20 (64.52)	11 (35.48)	
Education	Bachelor's	0 (0)	2 (60)	5 (40)	$\chi^2 = 3.30$ (0.51)
	Doctorate	3 (4.29)	37 (52.86)	30 (42.86)	
	Masters	1 (2.5)	28 (70)	11 (27.5)	
Electricity access	Adequate	4 (5.41)	31 (41.89)	39 (52.7)	$\chi^2 = 25.66$ (<0.001)
	Inadequate	0 (0)	37 (90.24)	4 (9.76)	
Internet access	Adequate	4 (5.8)	28 (40.58)	37 (53.62)	$\chi^2 = 24.86$ (<0.001)
	Inadequate	0 (0)	40 (86.96)	6 (13.04)	
Workspace condition/	Non-poor	4 (5.13)	33 (42.31)	41 (52.56)	$\chi^2 = 28.43$ (<0.001)
	Poor	0 (0)	35 (94.59)	2 (5.41)	
Research materials	Non-poor access	4 (4.55)	43 (8.86)	41 (46.59)	$\chi^2 = 16.39$ (<0.001)
	Poor access	0 (0)	25 (92.59)	2 (7.41)	
Caring for dependents (children, elderly etc)	No	4 (5.41)	28 (37.84)	42 (56.76)	$\chi^2 = 38.95$ (<0.001)
	Yes	0 (0)	40 (97.56)	1 (2.44)	

Note: in Table 2, counts are given and the frequencies are provided in parentheses. Fisher's exact test was used to estimate the p-value in parenthesis.

Table 3: Factors influencing weekly working hours during Covid-19 lockdown

VARIABLES	POISSON (IRR)	STD. ERR	Z VALUE	NB (IRR)	STD. ERR	Z VALUE
Age—Under 40 years[ref]						
Age—40 years +	1.0466	0.1081	0.44	1.0570	0.0931	0.63
Gender—Female[ref]						
Gender—Male	1.2292	0.1165	2.18	1.1961	0.1113	1.92
Household size—5 members[ref]						
Household size—6 members +	1.0414	0.1242	0.34	1.0006	0.1049	0.01
Education—Master's degree[ref]						
Education—Doctorate degree	0.9139	0.1063	-0.77	0.9036	0.0921	-0.99
Sector—Rural[ref]						
Sector—Urban	0.9478	0.1321	-0.38	0.9944	0.1322	-0.04
Virtual classes—No[ref]						
Virtual classes—Yes	1.1752	0.1591	1.19	1.2461	0.1630	1.68
Work at home—Occasionally[ref]						
Work at home—Often	1.7078	0.1871	4.89	1.6967	0.1756	5.11
Electricity access—Adequate[ref]						
Electricity access—Inadequate	0.8951	0.1111	-0.89	0.9585	0.1109	-0.37
Internet access—Adequate[ref]						
Internet access—Inadequate	0.9897	0.1016	-0.10	0.9575	0.0998	-0.42

Workspace condition—Not poor[ref]						
Workspace condition—Poor	1.1672	0.1551	1.16	1.1423	0.1400	1.08
Caregiver—No[ref]						
Caregiver—Yes	0.7924	0.1035	-1.78	0.7841	0.0935	-2.04
Health status—Not poor[ref]						
Health status—Poor	0.6370	0.0996	-2.88	0.6077	0.0910	-3.33
Constant	16.2368	2.9336	15.43	16.0895	2.7485	16.26
Log pseudolikelihood	-552.2158			-418.0211	/lnalpha	-1.7964
Pseudo R^2=	0.2437			0.0678	alpha	0.1659
Prob>chi2=	<0.001			<0.001		

Note: IRR implies the incidence rate ratios and NB denotes the negative binomial result.

Discussion

The major preoccupation of this study is to unravel the effect of the Covid-19 lockdowns and 'work-from-home' approach on the academic activities of academics at Nigerian tertiary institutions. We employed the number of weekly working hours devoted to academic and research engagement at home to proxy their productivity during the lockdown period. The results from the study show that the number of working hours spent on research activities reduced significantly during the lockdown period. However, the results further revealed that the impact of the lockdowns and 'work-from-home' approach on academic activities varied across gender, with male researchers spending more time on research than their female counterparts during the lockdown period. The finding is not surprising given the enormity of domestic activities that female academics are expected to take on at home. This practice is evident in Africa and particularly in Nigeria where all the home responsibilities fall to women. This result validates the findings of Staniscuaski *et al.* (2020), Than (2020) and Cui *et al.* (2020), that Covid-19 lockdowns had a stronger effect on the academic productivity of female researchers than their male counterparts.

Furthermore, inferences from the chi-square test conducted showed that erratic power supply, poor workspace condition and poor Internet facilities were the major factors responsible for the decline in the number of working hours during the Covid-19 lockdown. The finding is in line with studies by Onyema *et al*. (2020) and Okocha (2020) that these factors had a significant effect on research and academic activities in Nigeria. There is no meaningful academic engagement that can be achieved when the electricity supply is not stable and there is no strong Internet connectivity to access the right materials for research activities. This challenge is more worrisome during the lockdown as academics do not have access to their offices where they can use alternative facilities and this means that there will be extra expenditure on fuel to generate electricity and Internet connectivity.

To buttress the finding above, the results from the chi-square test also reveal that caring for dependent children and elderly people significantly influences the number of working hours devoted to academic activities in Nigeria. This factor is more prevalent among female researchers due to the increase in childcare needs occasioned by school closure. The results are in tandem with the findings of Cui *et al*. (2020) and Alon *et al*. (2020). This implies that educated mothers would have to devote more time to cater for their children and elderly parents and this would, in turn, reduce the number of working hours on academic activities during the lockdown periods. The results from the negative binomial regression confirm the findings from the chi-square test, which suggests that gender plays an important role in affecting the number of working hours among Nigerian academics and researchers. The results also affirm that male researchers devote more time to work than the female researchers.

Lastly, on the other variables, evidence from the negative binomial suggests that virtual learning or teaching and the ability to work from home increased the number of working hours of Nigerian academics during the Covid-19 lockdowns, while health challenges significantly reduced the number of weekly work hours. The implication is that lecturers spend more time sourcing the right materials and preparing for their online classes and this by extension will increase the number of hours of work on a weekly basis. Similarly, it is often said that 'health is wealth'. Therefore, anyone who is not healthy cannot be productive; as such, people tend to spend a substantial number of their working hours taking care of their health rather than deploying it in productive academic engagement.

Conclusion

Covid-19 had a negative effect on education, in 'learning disruptions and decreased access to education and research facilities, job losses and increased student debts' as argued by Onyema *et al*. (2020:1). It is on this premise that this study investigated the effect of Covid-19 lockdowns and the 'work-from home' approach on academic activities in Nigeria. In achieving its objective, we employed primary data. The questionnaire was developed on Google Forms and distributed via emails and social media platforms for members of higher institutions and professional networks. Academics in Nigerian universities, polytechnics and colleges of education made up the study's population. The study used both chi-square test and multivariable regression to examine the effect of lockdown and the 'work-from-home' approach on Nigerian academics' activities. The study reveals that the effect of Covid-19 lockdowns on the number of weekly working hours varied across gender, with male researchers spending more time on work than their female counterparts.

In addition, the findings indicate that factors such as inadequate power supply, electricity access, workspace and access to research materials, as well as health status and increased care for children and the elderly, were significantly associated with a decline in the share of time devoted to work during the Covid-19 lockdowns. On the other hand, virtual teaching or learning and the ability to work from home more often had positive and statistically significant effects on the weekly hours devoted to work during the lockdown. The implication from these findings is that a prolonged lockdown in Nigeria will harm the education system thereby adversely affecting the outcomes of academics in terms of the weekly hours devoted to work.

This study is not without limitations. A serious challenge faced during the conduct of this research was the difficulty in getting our respondents to fill the Google Form, which affected the sample size of the study.

To curb the negative impacts of lockdowns and the 'work-from-home' approach on academic activities in Nigeria, the study recommends the following.

1. All necessary cautions should be put in place to ensure the safe resumption of academic activities on campus. These cautions include washing hands, wearing a face mask, using hand sanitiser, disinfecting the premises and maintaining social distance where possible.
2. Adequate infrastructure, such as power supply, access to electricity, a good workspace and access to research materials should be made available to academics if there is a need for continuous lockdown.

3. Improvement in energy and telecommunications infrastructure, in order to provide a more conducive work environment for academics and enable a prompt embrace of remote education in Nigeria.
4. Virtual learning or teaching should be given more attention by all Nigerian institutions, as it will promote and facilitate learning and teaching in the face of another outbreak.
5. Finally, studies of the effect of the Covid-19 lockdown and the 'work-from-home' approach on academic activities in other African countries could provide a useful comparative insight.

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