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Socio-demographic determinants of children home learning experiences during COVID 19 school closure

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ABSTRACT

There were concerns about the inclusivity of learning for children living in countries with limited technology facilities during the COVID 19 school closure. This study investigates the socio-demographic determinant of engagement in home learning and the type of activity engagement for school children across Nigeria during the COVID 19 school closure. Regression and descriptive analysis of 1121 respondents revealed that household size, school communication and perceived socioeconomic status of parents were related to engagement in home learning while household wealth was associated to all types of activity engagement. We conclude that school communication is important for home learning

1. Introduction

At the beginning of the COVID 19 pandemic, many countries around the world adopted stringent measures including lockdown and school closure to curtail the spread of the COVID 19 pandemic (UNESCO, 2020). This affected 1.6 billion children worldwide, of which 240 million are from sub-Saharan Africa (Brossard et al., 2020). Consequently, home learning and education became the rational choice for many children. Home learning in this study refers to all learning activities or education activities conducted for school age children within the home. This includes online learning, offline learning platforms, and direct home teaching by household members. Some countries moved to online delivery of education while developing countries like Nigeria with limited internet infrastructure devised other various means to ensure that children keep learning at home during the school closure (Dreesen et al., 2020). The home learning activities in Nigeria includes radio and television-broadcast, private home tutors, teaching by parents, WhatsApp learning packages (this is the use of WhatsApp to send education lesson notes and homework to student from teachers while the children also send homework and questions related to educational lessons from internet mobile connected phone back to their teachers), paid educational lessons in the child's neighbourhood (although this violated lockdown rules), online videoconferencing classes or tutoring from school, and offline learning programs with videos, apps and games etc.

However, there are concerns about the inclusivity and appropriateness of the varying home learning options for differing children across the world, especially in developing countries like Nigeria given the limited evidence regarding best practices or best activities for home learning with children (Brossard et al., 2020; Drane et al., 2020; UNESCO, 2020). This is because previous literature indicate that the sociodemographic characteristics of children's home environment are related to their learning opportunities(Parker, Boak, Griffin, Ripple & Peay, 1999). For instance, children from poor households may live in homes without devices or materials (such as radio, television, internet and books) that are essential for home learning (Ariyanti, 2020; Dreesen et al., 2020). Furthermore, the availability and the engagement of parents is important for home learning, particularly in countries where there is limited access to technology (Brossard et al., 2020; Putri et al., 2020). This because the educational level of children care-

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givers can impede children's ability to learn at home and teachers may have limited access to teach children remotely during school lockdown.

Reports indicates that less than 50 percent of Nigerians have access to internet (International Telecommunication Union, 2019; United Nations, 2019) while majority of the Nigerian children with internet access are from rich socioeconomic and urban households (Obiakor & Adeniran, 2020). A study of Nigeria, Tanzania and Rwanda showed that adolescent in rural areas, had limited access to internet resources due to low-level of education, low income and lack of digital skills(Chair, 2018).Additionally, previous studies in Nigeria have suggested that learning opportunities are associated with children sociodemographic backgrounds. For instance, a national sample of 74 626 Nigerian children and adults revealed that the percentage of enroled school age children was associated with socioeconomic background and regions where children lived. Household income determined school enrolment while parental education determined the gender education gap within households (Olaniyan, 2011). Aremu (2004) likewise found that the academic achievement of some 280 Nigerian adolescent was associated with parental education and parental discipline. In addition, children from higher socio-economic background are likely to access better learning resources, attend private schools with technology facilities than children from lower socioeconomic households who are more likely to attend schools with lesser access to technology facilities (Härmä, 2016; Obiakor & Adeniran, 2020; Rolleston & Adefeso-Olateju, 2014). Subsequently, children sociodemographic background may likely affect the home learning experiences during the COVID school closure.

This study therefore aims to explore the sociodemographic associations of children home learning activities during the COVID 19 school closure in Nigeria. The term "socio-demographic" in this study refers to the children characteristics to include gender, level of education and family socioeconomic status. Saifi and Mehmood (2011) defined socioeconomic status as "the combined measure of individuals or families economic and social position relative to others based on income, education and occupation these includes family incomes, parental educational level, parental occupation and social status in the community". This study is relevant to: (1) provide insight into designing strategies that will ensure appropriate home learning experiences that is inclusive for all children during subsequent school closure; 2) provide insights into techniques that can be used to enrich learning opportunities for children in and out of school even when there are no crisis; and 3) ensures quicker education system response during future crisis.

2. Literature review

The sociodemographic characteristics of the home affects the home learning environment (Andrew et al., 2020b; Sk, Banerjee & Review, 2021). The home learning environment in which children live are essential to their ability to learn outside the school context (Sk et al., 2021; Evans, Kelley, Sikora, & Treiman, 2010). The home learning environment includes the availability of resources that facilitate learning within the homes as children with more resources have more and better opportunities to learn (Bol, 2020). These resources can be material and immaterial resources. The material resources include the availability of books and learning gadgets, while the immaterial resources are majorly linked to parental involvement, and family composition (Bol, 2020; Brossard et al., 2020). It is therefore clear that the home learning environment is significantly determined by the home sociodemographic composition.

2.1. Material resources

Studies have consistently revealed that household socioeconomic factors to include income and educational status are sociodemographic factors that affect children's educational material resources and opportunities (Breen & Jonsson, 2005). Review of literature on the education opportunities and outcomes for children in Nigeria indicate associations between the educational opportunities and parental income status (Kainuwa, Binti & Yusuf, 2013). According to Nigeria Federal Ministry of Education (2014), persons from the top family income quartile are 8 times more likely to obtain a bachelor's degree by age 24 as compared to individuals from the lowest family income quartile while secondary school dropout rate amongst persons 16–24 years old was highest in low-income families (11.6 percent) as compared to high-income families (2.8 percent)(Federal Ministry of Education, 2014).During the COVID 19 school lockdown, household socioeconomic status may affect children's home learning experiences in many ways. Firstly children from low socioeconomic households may have little educational facilities or resources for home learning (such as computers, and books), consequently restricting the opportunities for home learning (Angus, Snyder & Sutherland-Smith, 2004; Ariyanti, 2020). This problem becomes amplified when children need to primarily learn at home and the limited educational resources has to be used by more children within the household (Bol, 2020). It is also possible that the COVID 19 pandemic stresses the family income, further reducing the resources that families can allocate to children's education (Andrew et al., 2020a). Secondly, household socioeconomic profiles may affect school support or school resources for home learning(Azubuike, Adegboye & Quadri, 2021). Children from low-income households are likely to attend schools with lesser technology facilities to facilitate online tutoring for students(Drane et al. 2020; Agwu & Atta, 2020). For instance, Children from poorer households had limited access to school support for home learning during the COVID 19 school lockdown in the UK (Andrew et al., 2020b).

2.2. Immaterial resources

Furthermore, evidence suggests that immaterial resources for learning at home are also linked to varying demographic factors. For instance, parental involvement, an essential resource for children home learning is determined by the parental and family demographic characteristics (Hoover-Dempsey et al., 2001b). Firstly, the number of adults or caretakers within the household impacts on the availability of parents to get involved in children home learning (Bol, 2020). Generally, households with more adult caregivers, including those with two parents are better involved in their children's learning, since responsibilities to care for children within the home can be shared amongst the parents or caregivers (Bol, 2020). Children who live with single adults or aged adults may not enjoy adequate learning opportunities at home (Bol, 2020). Secondly, the educational status of the parents plays a role in their involvement in their children's learning. Children with highly educated parents may get more parental support in their education than children with lesser educated parents (Lee & Bowen, 2006). Educated parents may feel more capable and able to help their children with learning (Hoover-Dempsey et al., 2001a). In addition, highly educated parents may be more motivated about the importance of education, and offer their children better opportunities to learn (Lareau, 2011). These factors may determine the prospect of children's home learning during school closure.

2.3. Children's level of education

The relationship between children home learning experience may also be bi-directional. This implies that children learning experience may not only depend on their family or household background but may be affected by other child specific characteristics. Literature suggest that children's home learning experiences could be affected by the child's level of education, age, gender, academic difficulties, and academic performance in school (Patall, Cooper, & Robinson, 2008). For instance, previous studies indicate that parental involvement in children's learning at home reduces with children's age and level of education (Lau, Li, & Rao, 2011; Pang I-wJERfP, Practice, 2004) Similarly, Bol (2020) reported that, in the Netherlands, children's home learning experiences during the COVID 19 lockdown were associated with children's level

of education. Highly educated parents provided more support for their primary school children than low educated parents. A survey of 9810 Czech children learning experience during the COVID 19 school lockdown also indicated more home learning difficulties with older children (Brom et al., 2020).

2.4. Purpose of the study

There is limited information on home learning experiences of children during the COVID 19 compulsory school lockdown in Nigeria. This study explores the association of sociodemographic factors (to include children's education level, parent's educational status, parental age, the household socioeconomic status, household geographical location and household size) with children's learning activities during the COVID 19 school closure in Nigeria. The socio-demographic factors were determined by reviewing studies relating to home learning environment for children. We focus on children's learning activities because they provide the opportunity to understand what opportunities are possible for different children. Consequently, policies and interventions can be tailored to target children belonging to different social demographies.

This present study is guided by the following research questions:

2.4.1. Research questions

1 What sociodemographic factors are associated with home learning activities for children during the lockdown? This research question does not focus on any specific learning activity but on engagement or involvement in any type of home learning activity.
2 What is the perception of usefulness of the different types of home learning activities in Nigeria?
3 What sociodemographic factors are associated with the uptake or adoption of the various types of home learning activities in Nigeria?

3. Methodology

3.1. Study setting: Education system in Nigeria

Nigeria is administratively, divided into 36 states and a federal Capital territory (Abuja) which are grouped into six geopolitical regions; North-east, Northwest, North-central, South-east, South-South and South-west. The administration of the education system is shared mainly amongst the Federal and State Ministries of Education. The state ministry of education manages the education system at state levels while the Federal ministry ensures the coherence and coordination of the education policy and procedures across all 36 states in the country. Education in Nigeria is organized into 6 years of primary education, 3 years of junior secondary school, 3 years of senior secondary education and 4 years of university/ polytechnic/ college education.

The COVID 19 school closure in Nigeria started on March 19, 2020 and full school resumption was not declared until October 12, 2020. About 39 million children in pre-primary, primary and secondary school were affected by the school closure in Nigeria (UNESCO, 2020). However, due to the limited access to internet and technology in Nigeria a blend of technological platforms and traditional media was used to ensure continued learning during the school closure in Nigeria (Azubuike et al., 2021).

3.2. Procedure

This cross-sectional survey used an anonymous online questionnaire to collect data from 1121 parents and guardians of Nursery, primary or secondary school students across the 6 geopolitical zones of Nigeria. The survey was conducted online during the lockdown in Nigeria between July 2 - July 20,2020. Due to the COVID 19 social distancing rules, movement restriction and the lack of relevant secondary data for representative sampling, this study used a snowball sampling method which aimed at reaching a large participant in a swift way. It is important to keep in mind that the greatest bias in our study is its electronic administration. Primarily, families interested in the research and who had internet connections took part in the research.

The questionnaire was hosted and administered on Google form and Qualtrics. Researchers of the study sent potential participants the questionnaire link via Social media (Whatsapp and Facebook posts) and asked participants to participate in the online survey. The social media contact of researchers covered the six geo – political zone of Nigeria. Participants were asked to advertise the survey link to other potential participants.

Ethical approval was obtained from Babcock University Health Research Ethics Committee. Participation was completely consensual, voluntary, anonymous and informed consent was obtained from all participants. The Platforms were programmed to provide information about the purpose of the study, confidentiality of response, use of data, and informed voluntary consent before it administered any question. Afterwards, questions to affirm all the aforementioned were administered to study participants. This was achieved by programming Google form and Qualtrics to end the questionnaire administration if the participants did not satisfy all of the following: (i) agreed to the statement of voluntary informed and anonymous participation (ii) indicated that they were above 18 years (iii) indicated that they have a child in nursery, or primary or secondary school in Nigeria. (iv) indicated that no household member had previously participated in the study. The study eligibility criteria were that the participant was older than 18 years, a parent or guardian of children in Nursery or primary or secondary school in Nigeria and no household member had previously participated in the research. Participants were also informed that they could end their participation in the study by closing the Google form or Qualtrics platform at any time.

3.3. Variables

A pretested structured questionnaire was constructed and used as the research instrument. The online questionnaire was designed in sections and contained the information indicated below.

I. Demographic characteristics: These included the gender, age, marital status, number of people older than 16 years within the household, number of children in nursey, and /or primary and /or secondary school within the household, class category of children within the household, and region of residence;
II. School related information of the child: These are information on whether the school communicated learning instructions to parents during the school lockdown, and whether the school provided any form of continued online learning during the lockdown.
III Socioeconomic characteristics. Multidimensional index was used. They are:
   a. Perceived financial situation: Participants were asked to indicate their perceived financial situation on a 4-point scale. This includes: "I don't meet basic needs", "I just meet basic needs", "I live comfortably", "I meet needs with a little left".
   b. Poverty: Household expenditure on basic needs of food, shelter, clothing on monthly basis
   c. Educational qualification of participant and educational qualification of spouse if married
   d. Wealth: Binary question on the quality of some household finishing and availability of some household asset. These include television, refrigerator/fridge, shared bathroom/toilet with other households, water running within the house, vehicle, air conditioner, washing machine, all room floors finished with ceramic/polished wood/viny/ stone in the house, laptops, generator, and mattress
IV. Type of home learning activities engagement: Activities include television and/or radio teaching broadcast, use of WhatsApp learning

packages (the use of whatsapp to send education lesson notes and homework to student while children also send homework and questions related to sent educational lessons from internet mobile connected phone), private paid tutors, paid educational lessons in the child's neighbourhood (although this violated lockdown rules), online videoconferencing classes or tutoring from school, and offline learning programs with videos, apps and games.

V. Perception of activity usefulness: Measured on a 5-point single item as an ordinal variable, for each of the activities. Response ranged from "very useful" to "unable to say". Parents were asked to respond to the question even if their children did not use the method at home.

3.4. Data analysis

Data analysis was performed using the IBM SPSS version 27. Descriptive analysis was conducted for variables of interest and binomial logistic regression was used to answer research question 1 and 3. Only descriptive statistics was used to answer research question 2. Some variables were computed from the data. This includes:

a. Household size: Calculated by adding the number of children either in nursery, primary or secondary school together with the number of people older than 16 years within the house. We used age 16 to calculate the number of possible adults in the household because this is the average school age for children in Nursey, Primary and secondary school classes in Nigeria. Household sizes that was larger than 13 was considered as a data entry error by participants and was replaced with median value during the analysis.
b. Family educational status of the household was calculated as the average of the participant's level of education and the spouse's level of education.
c. Poverty level: This was measured by the expenditure using the FGT model. The poverty line was established at USD$1.90[1] which was equivalent to ₦684[1] per capita daily being the international poverty line set by the World Bank (2015). When a household's daily per capita expenditure falls below the established poverty line, such households are considered to be living in extreme poverty. The indicator assessed participants as either poor or not poor. The FGT model is specified as follows:

$$P_{\alpha} = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{Z-Y}{Z}\right)^{\alpha}$$

Where:
Pα = P = Foster, Greer and Thorbecke (FGT) index ($0< p<1$)
Z= Poverty line,
N= Total number of respondents (household heads)
H= Number of respondents below the poverty line
Y= Average per capita household expenditure of the respondents
α= Non-negative poverty aversion parameter.

d. Wealth status: Following Filmer and Pritchett (2001) and Córdova (2009), the wealth indexes was constructed for the respondents using asset indicators that rely on Principal Component Analysis (PCA) based on the first principal component. The indicator is a 5-point index ranging from extremely poor to extremely rich. The measure depicts an individual or a household's long-run economic status and therefore do not necessarily account for short-term fluctuations in economic well-being or economic shocks.

[1] USD$1 was equivalent to ₦360 as at the time of conducting the study based on the official Nigeria Central Bank rates.

Table 1
Sociodemographic characteristics of participants.

Respondent Characteristics	N	%
Sex of Respondent		
Female	554	49.4
Male	567	50.6
Marital status		
Married Parents	1002	89.4
Single parents (unmarried, widowed, separeted, divorced)	119	10.6
Children level of education		
Nursery	463	41.3
Primary	424	37.8
Secondary	233	20.8
Region of residence		
North Central	111	9.9
North east	375	33.5
North west	64	5.7
South East	47	4.2
South-south	74	6.6
South west	450	40.1

Table 2
Socioeconomic status of participants.

Education		
Degree	410	36.6
Postgraduate degree	526	46.9
Non -degree	185	16.4
Perceived financial situation		
Don't meet basic needs	199	17.8
Just meet basic needs	314	28.0
live comfortably	312	27.8
meet needs with a little left	296	26.4
Expenditure Assest[a]		
Poor	502	44.8
Non-Poor	619	55.2
Wealth[b]		
Extremely Poor	456	40.7
Poor	50	4.5
Average	92	8.2
Wealthy	160	14.3
Extremely Wealthy	363	32.4

4. Result

4.1. Descriptive statistics

4.1.1. Sociodemographic characteristics of participants

Participants mean age is 37.91 with standard deviation of 9.52. Average household size is 5.24 with standard deviation of 1.85.Most (89.4%) of the study were married parents while only 10.6% were single parents. Although all the geo-political regions of Nigeria were represented, there was an uneven distribution of participants across the geo-political regions. The south west (40.11%) and North east region (33.5%) accounted for most of the study participants with few participants from the other four regions of the country. Details are indicated in Table 1.

4.1.2. Socioeconomic status of participants

Most of the participants had at least, a graduate degree level of education. 36.9% had graduate degree, 46.6% were postgraduate degree holders and only 16.4% were non- degree graduates. The expenditure index scale also showed that about half of the participants were above the World Bank poverty line of 1.90 dollar daily living expenditure. Only 17.8% of the participants reported not been able to meet their basic needs. Household asset index also showed that only 9.2% of the participants were either poor or extremely poor. More details are included in Table 2.

4.1.3. Participation in home learning activities

Results show that 14.7% of the study participant's children did not participate in any home learning activity while 42.1% of the participants

Table 3
Participation in learning activities.

Engagement with learning activities in one single method		
Radio or television broadcast for learning	119	10.6
Offline educational programs: videos, games	50	4.5
Online videoconferencing classes or tutoring by their school	45	4.0
Private tutor teaches at home	133	11.9
Paid lesson (coaching) nearby the home	38	3.4
Whatsapp online packages	302	26.9
Overall engagement in learning activities		
Radio or television broadcast for learning	241	21.5
Offline educational programs: videos, games	225	20.1
Online videoconferencing classes or tutoring by their school	125	11.2
Private tutor teaches at home	229	20.4
Paid lesson (coaching) nearby the home	66	5.9
Whatsapp online packages	507	45.2
Is your child attending to all required schoolwork sent from school		
I don't know	27	2.4
No, none of it	163	14.5
Not applicable	225	20.1
Yes, all of it	333	29.7
Yes, most of it	229	20.4
Yes, some of it	131	11.7

engaged their children in multiple learning activities. About 69.7% of the participants were communicated from the children's school during the lockdown and 61.8% received some form of homework or learning package from their children's school during the lockdown. However, only 29.7% of the participants reported that their children submitted or attended to all required schoolwork or assignment sent from the school during the lockdown. Furthermore, Whatsapp learning packages was the most widely use major home learning activity. This is because 49.5% study participants reported engagement with Whatsapp learning packages as the only home learning activity for their children. Details are presented in Table 3.

4.2. Research question one

4.2.1. Associations between sociodemographic factors and engagement in home learning

Regression analysis result indicated that household size, school communication, sex of respondent, and perceived socioeconomic status of the respondent were associated with participation in any form of home learning activities during the school lockdown in Nigeria.

Children who lived in larger households were more likely to learn at home. Households that received communications from the schools were also likely to participate in a learning activity at home. Perceived financial situation was also positively associated to participation in home learning activities. This implies that children from households where parents report "to meet needs and have a little left" were more likely to engage in learning activities than parents who reported not to meet basic needs (see variable section for details). Furthermore, the female study participants were more likely to have their children learn at home than the male study participants. Details are in Table 4.

4.3. Research question two

4.3.1. Parental perception of home learning activities usefulness

Most of the participants perceived that the radio and television teaching broadcast were very useful for children home learning. Employing a private tutor to teach children at home was also considered very useful by most participants. Although attending a paid lesson during the school lockdown was an illegal activity in Nigeria, more study participants considered this as a very useless learning activity and more participants were neutral in their response regarding its usefulness compared to other home learning activities. Details are in table 5.

4.4. Research question 3

4.4.1. Factors associated with type of learning activities utilisation

Generally, wealth status was the only factor that was associated with utilisation of all the types of learning activities in this study. As previously indicated, wealth status was measured by the quality of some household finishing and availability of some household assets. Wealth was positively associated with usage of radio/television broadcast, WhatsApp online packages, other offline educational programs and online videoconferencing learning. However, wealth was negatively associated with private tutor usage and paid lesson nearby the home. This implies that participants with more household assets were likely to engage their children in learning activities that did not require a tutor from outside of the home, while households with lesser assets were likely to employ the use of tutors from outside of the home.

Another socioeconomic factor that was associated with the type of learning activities is the family level of education. The family level of education was also associated with use of radio and television broadcast, private tutor, and WhatsApp online packages. Households with lower education levels were likely to use more of radio/television broadcast while households with higher levels of education were likely to use WhatsApp packages and private tutors.

In addition, being in a primary class and region of residence were associated with three types of learning activities. In this regard, radio/television broadcast, WhatsApp online packages, and offline educational programs were associated with children in primary classes. It seems that the children in primary classes engaged more in learning activities that did not include the use of tutors from outside of the home.

Other demographic factors including marital status and sex of respondents were associated to few activities. Marital status was associated with WhatsApp online package usage. Children from households with married parents were likely to use WhatsApp packages. Children from households with male respondents were also likely to engage in videoconferencing

Age, perceived financial status, poverty level (measured by expenditure of the participants) were not associated to any of the learning activities. Details contained in Tables 6-11.

5. Discussion

This study explores the sociodemographic associations of children's home learning activities during the COVID 19 school closure in Nigeria. We aimed to identify the factors associated with home learning and which factors were associated with the type of home learning activities

Table 4
Regression analysis of sociodemographic factors and Home learning.

Variables	B	SE	P	OR	OR [95% CI] LOWER	UPPER
Household size	.162	.057	.004	1.176	1.053	1.315
Perceived financial situation	.352	.103	.001	1.422	1.163	1.738
Children's level of Education[a]			.			
Primary class	.173	.222	.437	1.189	.769	1.838
Secondary class	.378	.279	.175	1.459	.845	2.519
Sex of the respondent[b]	−0.541	.201	.007	.582	.393	.863
Family educational status	−0.053	.108	.622	.948	.768	1.171
School communication[d]	−2.361	.218	.000	.094	.061	.145
Wealth status	.121	.070	.081	1.129	.985	1.294
Poverty Status	.304	.219	.165	1.356	.882	2.083
Marital status	.069	.289	.811	1.072	.608	1.890
Region of residence[c]			.			
North East	−0.298	.437	.495	.742	.315	1.749
North West	−0.037	.566	.948	.964	.318	2.924
South East	−0.683	.592	.248	.505	.158	1.611
South-south	.056	.532	.916	1.058	.373	3.001
South West	−0.058	.435	.895	.944	.402	2.216
Participant Age	.010	.010	.342	1.010	.990	1.030
Constant	1.089	1.068	.308	2.970		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.
[d] Communication from the school is the reference point; Communication with school was coded as 1, and no communication from the school was coded as 2.

Table 5
Parental Perception of Home learning activities usefulness[m] $N = 1121$.

Per	Paid lesson	Radio/ Television Broadcast N(%)	Private Tutor N(%)	Whatsapp N(%)	Videoconfernceing N(%)	Other offline educational activities like games N(%)
Neutral	107 (9.5)	44 (3.9)	68(6.1	72(6.4	74 (6.6)	90 (8.0)
Somewhat useful	418 (37.3)	349(31.1)	364 (32.5)	423 (37.7)	393 (35.1)	389 (34.7
Very useful	492 (43.9)	663 (59.1)	626 (55.8)	529 (47.2)	552 (49.2)	558 (49.8
	81.2	90.2	88,3	84.9	84.3	84.5
Somewhat useless	82 (7.3)	46 (4.1)	50(4.5)	72 (6.4)	74 (6.6)	64 (5.7)
Very useless	22 (2.0)	19 (1.7)	13(1.2)	25 (2.2)	28 (2.5)	20 (1.8)
	9.3	5.8	5.7	8.6	9.1	7.6

m: all respondent were all asked to answer this question even if their child did not use it.

Table 6
Regression Analysis of Sociodemographic factors and use of Radio/Television Broadcast.

	b	SE	P	OR	LOWER	UPPER
Household size	.184	.047	.000	1.201	1.096	1.317
Perceived financial situation	.094	.089	.291	1.099	.922	1.309
Children's level of Education[a]						
Primary class	.562	.186	.003	1.754	1.218	2.526
Secondary class	.367	.222	.098	1.444	.934	2.232
Sex of the respondent[b]	.350	.164	.033	1.420	1.029	1.958
Family educational status	−0.848	.092	.000	.428	.358	.512
Wealth status	.204	.057	.000	1.227	1.097	1.372
Poverty Status	.131	.175	.454	1.140	.809	1.605
Marital status	−0.328	.240	.170	.720	.450	1.152
Region of residence[c]						
North East	−0.244	.308	.430	.784	.428	1.435
North West	−0.209	.435	.632	.812	.346	1.905
South East	−0.195	.504	.698	.822	.306	2.211
South-south	−0.399	.432	.355	.671	.288	1.563
South West	.063	.292	.829	1.065	.601	1.889
Participant's Age	−0.009	.009	.301	.991	.974	1.008
Constant	1.045	.835	.211	2.844		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

Table 7
Regression Analysis of Sociodemographic factors and use of paid private tutor.

	b	SE	P	OR	OR [95% CI] LOWER	UPPER
Household size	−0.020	.044	.649	.980	.899	1.068
Perceived financial situation	−0.078	.080	.330	.925	.790	1.082
Children's level of Education[a]						
Primary class	−0.037	.171	.827	.963	.689	1.346
Secondary class	−0.277	.216	.201	.758	.496	1.159
Sex of the respondent[b]	.140	.153	.360	1.151	.852	1.554
Family educational status	.265	.089	.003	1.304	1.095	1.553
Wealth status	−0.109	.051	.032	.897	.812	.991
Poverty Status	−0.150	.163	.356	.860	.625	1.184
Marital status	−0.019	.262	.942	.981	.587	1.639
Region of residence[c]						
North East	.759	.322	.019	2.135	1.136	4.015
North West	.459	.435	.292	1.582	.674	3.714
South East	−0.235	.558	.673	.790	.265	2.357
South-South	.361	.427	.398	1.435	.621	3.313
South West	.733	.312	.019	2.081	1.129	3.835
Participant's Age	−0.009	.008	.285	.991	.976	1.007
Constant	−2.235	.845	.008	.107		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

Table 8
Regression Analysis of Sociodemographic factors and use of WhatsApp online packages.

	b	se	P	OR	OR [95% CI] LOWER	UPPER
Household size	−0.091	.041	.026	.913	.843	.989
Perceived financial situation	.229	.072	.001	1.257	1.092	1.447
Children's level of Education[a]						
Primary class	.322	.157	.040	1.380	1.015	1.876
Secondary class	.410	.188	.029	1.508	1.042	2.180
Sex of the respondent[b]	−0.184	.139	.184	.832	.634	1.092
Family educational status	.381	.088	.000	1.463	1.232	1.738
Wealth status	.214	.044	.000	1.239	1.136	1.352
Poverty Status	.060	.146	.682	1.062	.797	1.414
Marital status	.817	.272	.003	2.264	1.328	3.860
Region of residence[c]						
North East	−0.814	.249	.001	.443	.272	.722
North West	−0.688	.355	.052	.503	.251	1.007
South East	.161	.393	.681	1.175	.544	2.539
South-South	−1.077	.348	.002	.341	.172	.675
South West	−0.228	.237	.336	.796	.500	1.267
Participant's Age	.004	.007	.611	1.004	.989	1.018
Constant	−4.193	.814	.000	.015		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

used. Our result show that: (i) About half of the study participants engaged their children in multiple home learning activities; (ii) Perceived socioeconomic status, household size, sex of participants and communication from the school were associated with engagement in home learning; (iii) Wealth measured by household asset and house finishing was a factor associated either positively or negatively with all the types of learning activities; (iv) Parents perceived the radio/television programs as very useful compared to other learning methods and lesser educated parents reported engaging their children with it than highly educated parents.

This study shows the need for schools to keep communicating with children during school closure for home learning should this reoccur in the future. It is likely that the communication from the school motivated parents to engage their children in learning at home. Although this study is not about parental involvement in homework, previous studies have suggested that school invitation was a more influential factor for parental involvement in homework than socioeconomic factors (Dauber & Epstein, 1993). Parents were likely to get involved in their children's homework when they perceived invitation from their children or their children's school (Hoover-Dempsey & Sandler, 1997).

In addition, the large usage of WhatsApp home learning package as the most single used method of home learning during the school closure may also emphasise the importance of school communication during school closure. The WhatsApp online packages included lesson notes and homework that were sent from schools to parents for their children. Although our sample distribution had more of educated participants and parents with internet connection, the engagement in multiple activities may indicate that parents could not depend on any of the home learning activities as being sufficient for their children to learn at home during school closure. This further emphasise the significance of school communication during school closure.

Furthermore, it is not surprising that wealth measured by household asset was associated with all types of learning activities. Other studies regarding home learning for children during the COVID 19 lockdown in other countries (e.g. UK and the Netherlands) have suggested that wealth and poverty are specific factors that affected children's learn-

Table 9
Regression analysis of Sociodemographic factors and use of Paid lesson (coaching) near the house.

	b	se	P	OR	OR [95% CI] LOWER	UPPER
Household size	−0.013	.077	.862	.987	.849	1.147
Perceived financial situation	.388	.132	.003	1.473	1.137	1.910
Children's level of Education[a]						
Primary class	−0.116	.313	.711	.891	.483	1.643
Secondary class	.401	.340	.238	1.493	.768	2.905
Sex of the respondent[b]	−0.129	.265	.627	.879	.523	1.478
Family educational status	−0.089	.135	.509	.915	.702	1.192
Wealth status	−0.450	.096	.000	.638	.528	.770
Poverty Status	.360	.287	.211	1.433	.816	2.516
Marital status	−0.081	.419	.846	.922	.406	2.096
Region of residence[c]						
North East	−0.263	.475	.579	.769	.303	1.948
North West	−0.648	.737	.380	.523	.123	2.219
South East	−18.417	5649.649	.997	.000	.000	.
South-South	.140	.608	.818	1.150	.350	3.787
South West	−0.354	.460	.442	.702	.285	1.730
Participant's Age	.015	.013	.240	1.015	.990	1.041
Constant	−2.752	1.359	.043	.064		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

Table 10
Regression Analysis of Sociodemographic factors and use of offline educational programs (videos, games etc.).

	b	se	P	OR	OR [95% CI] LOWER	UPPER
Household size	−0.037	.046	.426	.964	.880	1.056
Perceived financial situation	.078	.082	.343	1.081	.920	1.270
Children's level of Education[a]						
Primary class	.466	.177	.008	1.593	1.126	2.253
Secondary class	.246	.212	.247	1.278	.843	1.938
Sex of the respondent[b]	−0.208	.155	.180	.812	.599	1.101
Family educational status	−0.037	.089	.682	.964	.809	1.148
Wealth status	.106	.052	.041	1.111	1.004	1.230
Poverty Status	.090	.165	.586	1.094	.792	1.512
Marital status	.365	.292	.212	1.440	.812	2.553
Region of residence[c]						
North East	−0.729	.273	.008	.482	.282	.824
North West	.065	.367	.860	1.067	.519	2.190
South East	−0.503	.449	.262	.605	.251	1.456
South-South	−0.222	.369	.549	.801	.388	1.653
South West	−0.235	.246	.340	.791	.488	1.281
Participant's Age	.006	.008	.453	1.006	.990	1.022
Constant	−2.169	.864	.012	.114		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

ing experiences during the COVID 19 lockdown (Andrew et al., 2020b; Bol, 2020). Our result indicates that wealthier households likely engaged their children in home learning activities that did not involve physical interaction with non-household members. They had the resources (internet and learning materials) that were essential for home learning. Previous studies suggested that children from wealthier households had adequate material resources for home learning (Angus et al., 2004; Bol, 2020).

Our finding that wealth and marital status were the key factors associated with online videoconference tutoring from school during the lockdown further confirms reports of remote learning inequalities for children during the COVID 19 lockdown in Nigeria (Azubuike et al., 2021). This confirms that children from wealthy households attended schools with adequate facilities for online tutoring. Schools that had access to internet facilities to provide online video tutoring in Nigeria are expensive private schools located in urban areas (De Lannoy, 2018; Härmä, 2016; Osunwusi & Abifarin, 2013; Rolleston & Adefeso-Olateju, 2014). Result indicating the positive association of perceived financial situation with involvement in home learning also affirms the relevance of household wealth for home learning activities. The results then imply that children from wealthier households had more learning opportunities and are more likely to be engaged in learning activities during the school closure. Consequently, these may further widen the educational inequality gaps in Nigeria.

Additionally, this study supports previous finding that suggests that lesser educated parents may be less capable to help their children's education compared to highly educated parents (Lee and Bowen 2006). Our result show that highly educated parents were likely to engage their children in home learning activities that required an adult or parental involvement (WhatsApp packages, and private tutor) while households with lesser educated parents were likely to engage with radio/television broadcast. This finding is also emphasised by the positive association of larger households with home learning. It is likely that larger households have more adults that help children with learning at home. This could also be linked to the greater levels of digital competencies amongst highly educated parents that have been reported in previous studies (Correa, 2015). These are factors to be considered when designing home learning activities for children.

Table 11
Regression Analysis of Sociodemographic factors and use of online videoconferencing classes.

	b	se	P	OR	OR [95% CI] LOWER	UPPER
Household size	.171	.061	.005	1.186	1.052	1.337
Perceived financial situation	.092	.118	.437	1.097	.869	1.383
Children's level of Education[a]						
Primary class	.082	.238	.729	1.086	.681	1.731
Secondary class	.300	.267	.262	1.349	.800	2.277
Sex of the respondent[b]	−0.424	.208	.042	.654	.435	.984
Family educational status	.157	.141	.264	1.170	.888	1.542
Wealth status	.477	.083	.000	1.611	1.370	1.894
Poverty Status	.411	.228	.071	1.509	.965	2.360
Marital status	18.982	3384.014	.996	175,318,241.842	.000	.
Region of residence[c]						
North East	−0.329	.353	.351	.720	.361	1.437
North west	−0.463	.567	.414	.629	.207	1.911
South east	−0.503	.564	.373	.605	.200	1.829
South-south	.191	.492	.698	1.210	.462	3.175
South West	−0.034	.315	.915	.967	.522	1.792
Participant's Age	.003	.011	.806	1.003	.981	1.025
Constant	−43.728	6768.029	.995	.000		

[a] Nursery class is the reference group.
[b] Female is the reference group.
[c] North central is the reference group.

However, our study has some limitations. Firstly, the cross-sectional nature of this survey precludes any causal interpretation. Next, our study sample lacks representativeness. Our result do not have a good representation of the regions and socioeconomic categories in Nigeria. Most of the respondents were resident in the North East and South West Nigeria. In addition, the administration of the survey also excludes participants that may not have internet access and likely lived in urban areas. Our sample distribution also consists of highly educated persons. Previous studies have shown that highly educated parents are more likely to be interested in their children's education than non-educated parent (Lareau, 2011). These limitations imply that our findings should be interpreted with caution.

5.1. Implication for policy

Despite the limitations of this study, our findings have implications for educators and policy makers for countries with limited technology facilities regarding home learning and improving learning opportunities for children. Firstly, schools should communicate to parents regarding the learning of their children during subsequent school closure. Schools should provide robust learning guidelines for parents to use during school closures. Secondly, the findings provide an insight into complementary actions that schools can adopt to improve learning opportunities even during non-pandemic time. School communication to parents during non-pandemic period can be utilised to encourage home learning for children during vacations and school periods. Furthermore, based on our findings on the wide perception of usefulness of radio/television broadcast and its association with less educated families, it is essential that educational radio and television broadcast be better adapted for comprehensive learning during school closure. Next, it is important that policy makers and educators consider the educational capability of parents in designing home learning activities for children. More home learning activities and strategies that would be suitable for children of less educated parents are needed in Nigeria. We suggest that school communication and involvement should better target children of lower educated parents.

6. Conclusion

The specific goal of this study was to identify how children with different sociodemographic profiles engage in home learning during school closure. School communication is an essential factor for children to learn at home. The study also showed that wealth is a significant determinant of the type of children home learning activity. Parents who perceived themselves to be financially comfortable are also likely to engage their children in home learning. This implies a learning deficit for many children during the COVID 19 school closure period. This study, therefore, suggests that educators and policy makers should take the sociodemographic composition of children's households into account when designing their home learning activities. Our policy implications can also be adapted by other developing countries with limited technology.

Declaration of competing interests

The authors declare that they have no conflict of interest

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