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## **DO SOCIO-DEMOGRAPHIC FACTORS AND SOURCES OF INFORMATION RELATE TO CLIMATE CHANGE AWARENESS? EVIDENCE FROM AFROBAROMETER ROUND 7 DATA**

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### **Abstract**

Climate change has been considered the most significant environmental catastrophe which is currently threatening human survival. Like the rest of other countries on the African continent, climate change in Nigeria has debilitating effects on both the people and the community due to vulnerability and poor coping capability of the people. Numerous studies related to the problem of rising temperatures in Africa are now being carried out and documented. However, only a little research evidence is available, particularly from Nigeria, regarding the way socio-demographic factors and sources of information are related to climate change awareness. The Afrobarometer Round 7 data for Nigeria was released in 2019 with a sample of 1600 drawn from the 36 states in the country through a clustered, stratified, multi-stage, random sample. The data were subjected to different statistical analyses of t-test, ANOVA, correlation, and regression. The study found that a majority of participants received information about climate change on the internet, social media, TV, and radio. Only a few of the participants obtained climate change-related information from the newspapers. The results showed significant differences in climate change awareness based on gender and place of respondents' residences. One-way ANOVA showed that significant differences exist in climate change awareness among educational and regional groups. However, no significant difference was found in the awareness of climate change among age groups. In contrast, a significant positive relationship among gender, place of residence, region, and awareness of climate change was observed. Internet news and climate change awareness were found to be negatively significantly related. Stepwise regression analysis showed that internet news was the most parsimonious set of climate change predictors. It is suggested that for a better understanding of climate change, government agencies and other stakeholders should use the internet and various social media platforms to disseminate information related to climate change. Subscription to social media platforms should be made cheap for the citizens for broader coverage which in turn engenders well-informed citizenry.

**Keywords:** Awareness; Climate change; Nigeria; Source of information; Socio-demographic.

## 1. Introduction

There is an overwhelming consensus among environmentalists, conservationists, geographers, climatologists, and other interested advocates on the fact that climate change is a reality humanity now lives with. There are varying degrees of public concerns about climate change. The signals are clearer, and consequences are visibly stirring us in the face daily that no one should still be in doubt. In the past few decades, climate change has been recognized as a major hazard to the natural environment, public health, and food security. Human ingenuity and ever-increasing actions, especially those resulting from industrial development coupled with the alarming population increase, have upset the balance of the environment (IPCC, 2018; Lujala et al., 2015; Steynor & Pasquini, 2019). These and many more concerns about effects of climate change on socio-economic landscape requires some level of awareness among the community members.

The term awareness can be simply and broadly defined as the state or quality of being aware of something. It means being knowledgeable, conscious, cognizant, and informed. With respect to climate change awareness, it is the consciousness of individual or group of the changes in the climate. Climate change awareness has been identified as a critical component in motivating the public to combat climate change as a global threat. Lack of awareness is a key barrier to climate change adaptation and environmental sustainability most especially in developing countries (Ghulam et al., 2019; Kuthe et al., 2020).

Climate change is a global phenomenon of climate transformation characterized by changes in the planet's normal climate (temperature, precipitation, and wind) driven primarily by human activity. According to National Aeronautics and Space Administration (NASA) (2019) climate change is “a broad range of global phenomena created predominantly by burning fossil fuels, which add heat-trapping gases to Earth’s atmosphere. These phenomena include the increased temperature trends described by global warming, but also encompass changes such as sea-level rise, ice mass loss in Greenland, Antarctica, the Arctic and mountain glaciers worldwide; shifts in flower/plant blooming; and extreme weather events.” (Youmatter, 2020). Succinctly, climate change refers to any observed variations in climate systems resulting from human activities, particularly those that interrupt the Earth's atmospheric equilibrium composition and eventually contribute to what is known as global warming.

Global warming refers to a rise in the Earth's atmosphere and ocean temperatures caused by human activities such as burning wood, wood products, and solid waste, burning fossil fuels (natural gas, coal, and oil), and burning solid waste. This phenomenon is also caused by fossil fuels resulting from the burning of vegetation and deforestation, mining and agricultural operations, livestock breeding, and deforestation (IPCC, 2015; 2018). Recent research evidence estimated that global warming is likely to exceed 1.5°C in the coming decades precisely by 2030, concluding that limiting warming to 1.5°C or even 2°C will be impossible to achieve unless fast, quick, and large-scale reductions in greenhouse gas emissions occur (Mora et al., 2018; IPCC, 2018; 2021). Uncontrolled greenhouse gas emissions are causing a slew of problems, including sea-level rise, hurricanes, fires, droughts, and floods.

Numerous studies related to the problem of rising temperatures in Africa are now being carried out and documented. The World Health Organisation (WHO) claimed that climate change is no longer a mere narrative. Instead, it has become a climate crisis that has emerged because there have been many health problems associated with it. The growing severity of extreme weather is one manifestation of climate change, which causes injury, sickness, and death in neonates due to heat stress, air pollution, and infectious diseases (Gennaro et al., 2017; Geruso & Spears, 2018; Nsengiyumva et al., 2020; Steynor & Pasquini, 2019; WHO, 2019).

Many scientists, social scientists, and environmental education scholars have carried out numerous studies on climate change, the causes, future effects, mitigation, and adaptation approaches (Fronzel et al., 2017; Lujala et al., 2015; Rankoana, 2016). Climate change research on a variety of topics - including adaptation, experience, and perception, the influence of socio-demographic factors on climate change sensitivity, knowledge, and understanding are available in the literature (Odafivwotu, 2015; Opaluwa et al., 2020; Ricart et al., 2018). Human views, behavior, and practices regarding climate change are influenced by variables such as personal beliefs, societal values, experience, and socio-economic demographics (for instance, gender, age, occupation, educational attainment, and place of residence).

In a study conducted in three cities in Turkey, Korkmaz (2018) found nearly half of the respondents were knowledgeable about climate change. Demographic information on

awareness of climate change disclosed females showed more concern about climate change than their male counterparts. Further, age and income were not determinants. Also, statistically significant differences were not found in climate change awareness based on age, class, income, and educational level. Using the 2007-2008 Gallup World data of 119 countries, Lee et al. (2015) studied the influence of perceived wellbeing, socio-demographic factors, beliefs, and geography on public risk perceptions, and climate change awareness. The study discovered that educational level was the most effective predictor of climate change awareness in all countries studied, that understanding anthropogenic sources was the most potent predictor of climate change risk perceptions in Europe and Latin America, and that perception of local temperature change was the most powerful predictor of climate change risk perceptions in most African and Asian countries studied. Haq and Ahmed's (2017) study in Bangladesh explored the socio-demographic dimension of perception of climate change. The result found differences in the perception of climate change across gender, marital status, religion, and age.

One of the variables of interest in the study is the source of information. There are two categories of information sources in the literature, namely social media and mass media. Examples of mass media are newspapers, television, radio, while social media include the Internet. The individual's level of awareness is a function of the source of information. The degree of information available to an individual on an issue will determine the level of awareness (Ajaero & Anorue, 2018; Popoola et al., 2020). Thus, the dissemination of appropriate climate change information is a critical factor to effective adaptation. Literature evidence revealed that the primary sources of information on climate change and related issues have been always updated through radio, television, neighbors/friends, and newspapers.

Selormey et al. (2019) study showed that majority of the respondents were aware of the change in climate and their major sources of information were family members and radio. Exposure to news from any source is associated with substantially higher levels of awareness. Respondents who get news daily from the internet (74%), social media (72%), and newspapers (72%) are substantially more likely to have heard of climate change than those who get daily news from television (65%) and radio (64%). Also, Nwabueze et al. (2019)

observed that farmers in Zamfara state had a high level of awareness of climate change through information sources such as Radio, Television, and extension services.

[González-Hernández et al. \(2019\)](#) in their study of climate change mitigation and adaptation action in Nuevo Leon, Mexico, used data from 622 households. Ordinal regression analysis revealed financial self-efficacy and perceived knowledge had a significant impact on the degree of household-level action taken. Furthermore, perception and socio-demographic characteristics were found to influence the mitigation and adaptation actions of respondents. [Ajuang et al. \(2016\)](#) study was to find out how much people in Upper Nyakach Division, Kisumu County, Kenya, knew about climate change. According to the findings, 90.9 percent of respondents had seen changes in the overall climate. Climate change awareness differed widely across the 11 sub-locations. The findings revealed that respondents' awareness of climate change was influenced by the gender of the household head, their education level, and their age. [Addisu et al. \(2016\)](#) found educational level, age, wealth status, and agricultural extension services as important factors affecting climate change adaptation. Parameters such as marital status, farm size, income generations, and access to information have a significant correlation to farmers' perceptions regarding climate change.

[Rahman et al. \(2021\)](#) conducted a study in Lao People's Democratic Republic (Laos), and Thailand to ascertain the understanding, attitudes, and practices (KAP) about climate change and dengue fever among rural and urban communities and government officials. They discovered large differences in attitudes toward climate change and dengue fever among people of different ages, levels of education, and socioeconomic status in selected communities in the two countries. Participants' understanding of climate change and dengue was strongly related to their level of education and socioeconomic status in Lao households. Climate change and dengue fever attitudes and practices were found to be linked to educational level and internet use.

[Ogunbode and Arnold \(2014\)](#) in their research conducted in Nigeria compared the effects of knowledge, morality, and threat perception of climate change behavioral intention. The result showed that the model of threat perception is the greatest influence on behavioral intent. [Ogunjinmi et al. \(2016\)](#) conducted a study on the impact of social media on awareness level and concerns about climate change of staff of the Federal University of Technology, Akure, Nigeria. The report revealed that social media is a key source of

information through which they learned about climate change. Social media was also found to affect their climate change awareness. [Sanga and Elia \(2020\)](#) explored socio-demographic factors of access to climate change information among tomato-growing farmers in Tanzania's Mvomero area using a mixed methods approach. The majority of farmers utilize radio as a source of climate change information, according to the data. Gender, marital status, age, education level, and income were also identified to be socio-demographic characteristics impacting access to climate change information. In a related study conducted in Osun State, Nigeria, [Ogunbode et al. \(2019\)](#) examined the level of climate change awareness and revealed that more than one-third of the respondents were no knowledge of climate change. Radio and Television were the major sources of information about climate change.

Nigeria is Africa's most populous and economically powerful country. By the end of the century, it is predicted to surpass China as the world's second most populated country, after India. In 2015, Nigeria was designated as the 17th largest greenhouse gas emitter in the world and the second-largest in Africa after South Africa. Rising temperatures, unpredictable rainfall, rising sea levels and flooding, droughts and desertification, land degradation, more frequent extreme weather events, and loss of biodiversity are the signs that Nigeria's climate is changing.

Rainfall duration and intensity have increased, resulting in huge runoffs and flooding in several parts of Nigeria ([Akande et al., 2017](#); [Haider, 2019](#)). Undoubtedly, Nigerians are feeling the effects of climate change. The extreme heat has impacted millions of people without access to air conditioning or electricity, with fluctuations in rainfall also found to be a threat to Nigeria's rain-dependent agricultural sector. Seasons of drought and excessive flooding have impacted agricultural activity and resulted in the loss of shelter in Nigeria as a result of climate change. Floods displaced nearly 1.9 million Nigerians in 2019, according to the National Emergency Management Agency ([Akande et al., 2017](#); [Akuwudike et al., 2018](#); [Haider, 2019](#))

The vast majority of the literature that provides evidence of climate change impacts and responses in Nigeria, however, focuses on the agricultural sector and individual farming communities in particular regions of the country. Although the situation of climate change has been recorded in Nigeria, large volumes of research have been conducted mostly on awareness, perception, mitigation, and adaptation to climate change ([Akuwudike et al.,](#)

2018; Ogunbode et al., 2019). These prior studies did not place specific emphasis on climate change awareness and its relationship to the source of information and socio-demographic factors. It can be noted that very little published literature existed on awareness of climate change and its relation to information sources in Nigeria. If stakeholders fail to consider the sources of information that may influence public awareness of climate change, as community members, researchers, and environmental educators, then it will be difficult to respond effectively to these issues. Thus, the need for more empirical evidence on the associations between climate change awareness and behavior, the source of information, and demographic factors are urgently needed.

This study examined the climate change awareness among Nigerians to: (1) deepen people's understanding of what drives climate change awareness, (2) make suggestions that could enhance information, communication, and education about climate change in the future. This study answers the following research questions to achieve those goals:

1. What is the level of climate change awareness among Nigerians?
2. Is there any significant difference in climate change awareness across socio-demographic characteristics of Nigerians?
3. What is the relationship between socio-demographic and sources of information and climate change awareness among Nigerians?
4. What factors influence climate change awareness among Nigerians?

To explain and determine why individuals differ on climate change, this study is hinged on the socio-psychological Theory of Planned Behaviour – TPB (Ajzen, 2011). The TPB, the theoretical framework for this study, postulated that human behavior is influenced by both intention and behavioral control (that is, motivation and ability). Based on the theory, the individual's intentions are formed by three basic components –(i) attitude, (ii) subjective norms, and (iii) perceived behavioral control. TPB is a behavioral model that is commonly used in comprehending how people's behavior can change. The TPB is effective in predicting knowledge, attitudes, and practices (KAP) in fields like healthcare practices, environmental behavior, sexual behavior (Macovei, 2015; Masud et al., 2016; Si et al., 2019). Drawing mainly from the TPB theory, this study conceptualizes a model to predict and understand how the chain of interactions among sources of information and socio-demographics on

climate change awareness. The model (figure 1) explains and predicts climate change awareness as a function of the influences of sources of information and socio-demographic characteristics. These model postulates that climate change awareness is influenced by socio-demographic factors and the source of information.

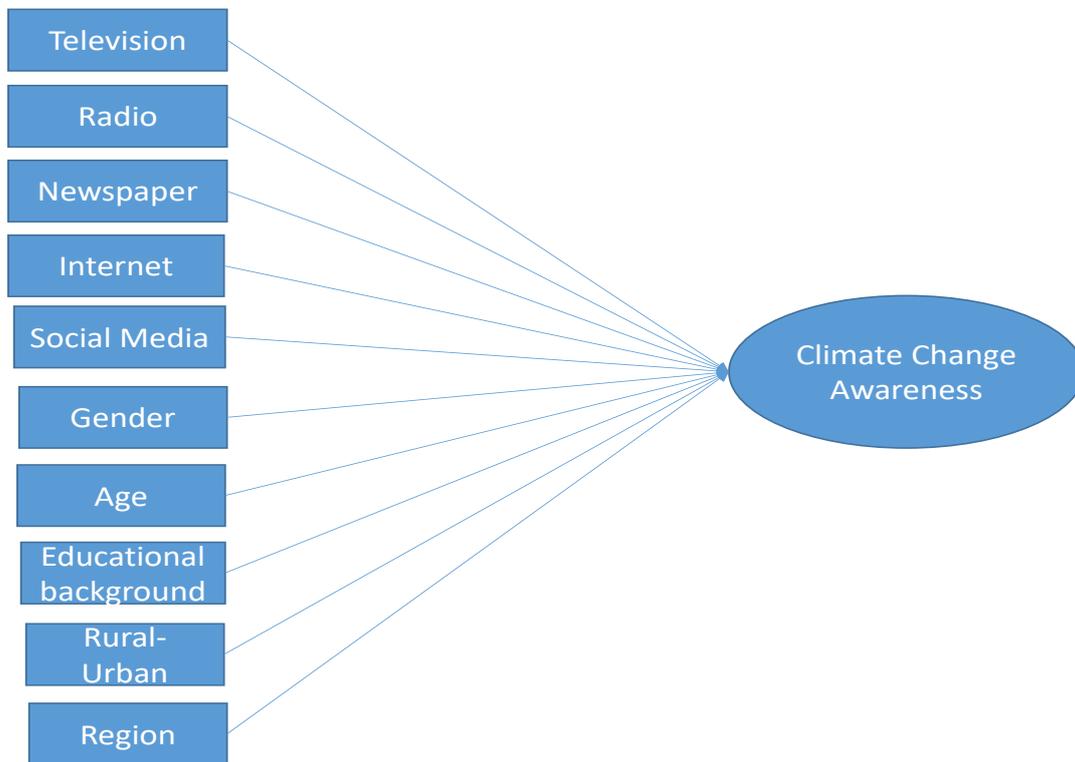


Figure 1. The conceptual model for the study

## 2. Methods

### 2.1. Data source

The study used the [Afrobarometer Round 7 \(2019\)](#) data for Nigeria. Afrobarometer is a pan-African polling network that has conducted cross-national surveys of African countries on economic conditions, governance, democracy, and related issues.

Surveys were performed through face-to-face interviews with nationally representative populations in the language of the respondent's preference ([Afrobarometer, 2017](#)). The survey employed a clustered, stratified, multi-stage, area probability sample. The country was first stratified according to the main sub-national unit of government (state, province, region, etc.) and by urban or rural location.

The samples were designed to generate a sample that is a representative cross-section of all citizens of voting age, namely citizens aged 18 and older in a given country. The sample excludes people living in institutionalized settings, such as students in dormitories, patients in hospitals, and persons in prisons or nursing homes. Furthermore, it excluded people in conflict or unsafe areas. The sample size of Round 7 for Nigeria was 1600 drawn from 36 states of the Federation and the Federal Capital Territory.

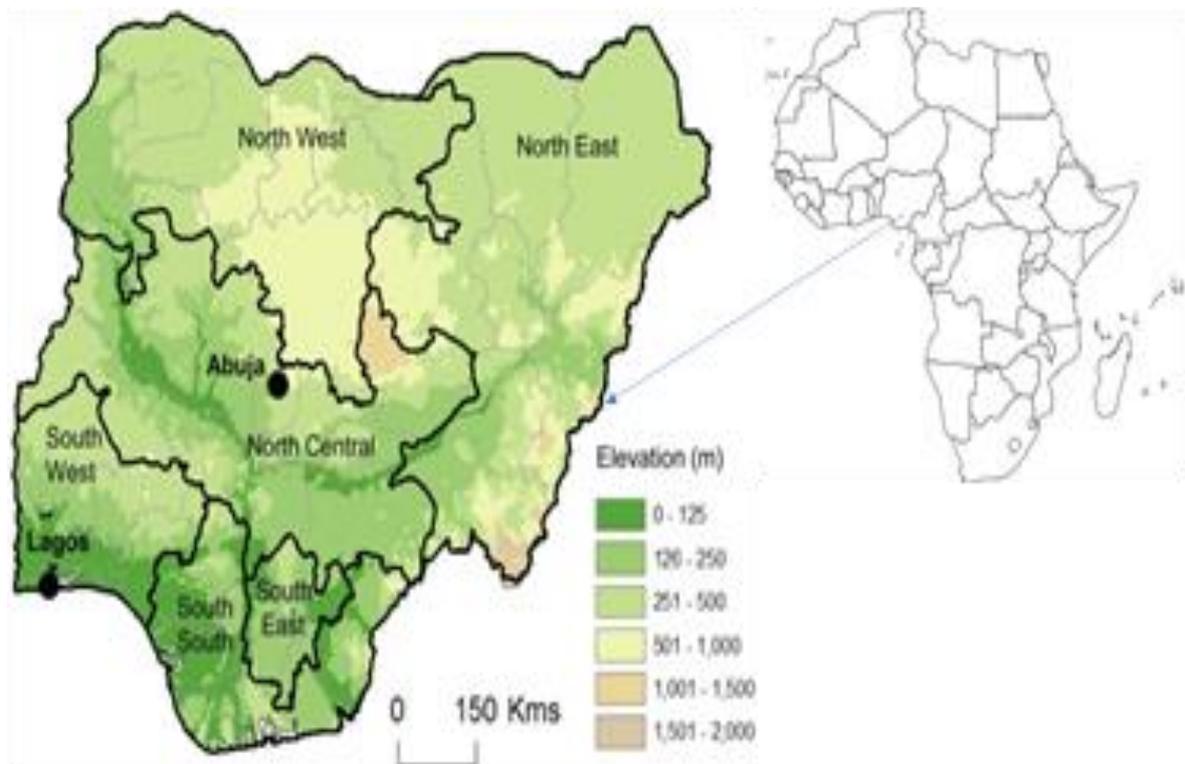


Figure 2. Map of Nigeria

Nigeria, with an estimated population of 206, 140 million (Statista, 2020) lies within the tropics between longitude 30 and 140 North, and latitudes 40 and 140 East comprising 36 states including the capital territory Abuja which is divided into six geopolitical regions (Figure 1). The landmass approximately covers an area of 923,768 km<sup>2</sup>. It measures about 1,200 km east-west and 1,050 km from north-south. The country's ecology comprises tropical forests to the south and dry savannahs to the far north. It has two seasons - the rainy season is between April and October, while the dry season is between November to March.

## **2.2. Variables**

Independent variables: Sources of information were measured through five items (Radio News, Television News, Newspapers, Internet news, and social media). Respondents' background characteristics, in this case, include gender, age, educational background, urban/rural, and region. The dependent variable, namely climate change awareness, was measured with eight (8) items designed on a 9-point Likert scale. These items were transformed by using the SPSS to create the climate change awareness variable. Some of the items are: 'Have you heard about climate change or haven't you had the chance to hear about this yet?', 'What does the phrase climate change mean to you?', 'Which of the following do you think is the main cause of climate change, or haven't you heard enough to say?', and 'Do you think climate change is making life in Nigeria better or worse, or haven't you heard?'

## **2.3. Analysis**

A descriptive analysis was first conducted for demographics and items for the measure. The study then examined the difference in the dependent variable by respondents' demographic characteristics using a T-test and ANOVA. Pearson Product Moment Correlation was used to determine the relationships between demographics and sources of information on climate change awareness. The stepwise regression aims to identify the most cost-effective and best pool of information sources and socio-demographic variables for predicting climate change awareness. Meanwhile, the alpha level was set at .05

## **3. Results and Discussions**

Table 1 provides a rundown of the respondents' demographic characteristics. The total sample size is 1600 which includes 801 females and 799 males. The respondents' average age is around 30 years. Nearly 44% had secondary education, 14.4% had no formal education, 13.6% had primary education, 13.1% had post-secondary education, and 15.1% had a university education.

Table 1. Frequency and percentage distribution of respondents by socio-demographic characteristics

Sex	Frequency	Percent
Male	801	50.1
Female	799	49.9
<b>Age</b>		
18-25yrs	598	37.3
26-35yrs	501	31.3
36-45yrs	262	16.4
46-55yrs	132	8.2
56-65yrs	67	4.2
66yrs above	41	2.5
<b>Educational background</b>		
No formal Education	230	14.4
Primary education	217	13.6
Secondary Education	702	43.9
Post-Secondary	209	13.1
University Education	241	15.1
<b>Place of Living</b>		
Urban	696	43.5
Rural	904	56.5
<b>Region</b>		
South-West	352	22.0
South-South	258	16.2
South-East	210	13.2
North-West	367	22.9
North-East	197	12.3
North-Central	215	13.4

In terms of place of residence, 56.5% were from the rural and 45.5% were in the urban area. The respondent had a more mixed profile of 13.4% North-Central, 12.3% North-east, South-west, and the North-west had 22.0% and 22.9% respective, 16.2% South-south, and 13.2% Southeast. Table 2 presents descriptive results of the source of information and awareness of climate change by participants.

Table 2. Minimum and maximum scores, mean scores, standard deviation, skewness, and kurtosis. (N=1600)

	Minimum	Maximum	Mean	S D	Skewness (SE=.061)	Kurtosis (SE=.122)
Radio news	0	9	2.83	1.357	-.950	-.374
Television news	0	9	2.00	1.652	.193	-.518
Newspaper news	0	9	.86	1.387	2.100	6.505
Internet news	0	9	1.45	1.823	.832	-.078
Social media news	0	9	1.47	1.845	.859	.065
Climate conditions compared to ten years ago	0	9	2.72	1.763	.911	2.523
Severity of droughts	1	9	3.50	1.829	1.254	2.191
Severity of flooding	1	9	3.64	1.694	1.094	2.284
Heard about climate change	0	9	.58	.907	6.370	57.120
Meaning	1	9	4.31	2.753	-.077	-1.855
Main cause	1	9	4.36	2.731	-.078	-1.845
Affecting country	1	9	5.13	2.111	-.497	-1.157
Needs to be stopped.	0	9	4.19	3.006	-.195	-1.702

Table 2 shows that radio news acts as the key source of information of climate change awareness with a mean score of 2.83, followed by Television news, Internet news, and social media networks. The findings suggested that Television and Radio remain the main source of knowledge on climate change related problems among Nigerians.

The results of the t-test in Table 3 revealed a significant difference between male and female climate change awareness. This result implies that males and females significantly differ in their awareness of climate change. The mean scores indicate that the female respondents tend to have higher awareness than their male counterparts. Similarly, a significant difference in awareness of urban and rural climate change was also found. Rural respondents showed more awareness of climate change than their urban counterparts. This difference may be associated with the fact that most rural people mostly rely on natural resources (as fuel) for their livelihoods, which invariably had an impact on climate change so they feel the consequences more than urban residents.

Table 3. Test of significant difference of climate change awareness by sex and place of residence.

	N	Mean	S D	t	Sig.
Male	801	27.27	10.62	-4.340	.000
Female	799	29.59	10.78		
Urban	696	27.57	10.59	-2.798	.005
Rural	904	29.08	10.85		

Analysis of variance (ANOVA) was conducted to decide whether there would be differences in awareness of climate change among Nigerians based on educational level, age, and regions (Table 4).

Table 4. Test of significant difference of awareness of climate change by educational level, region and age

Educational background	N	Mean	S D	Statistics
No formal Education	230	31.9649	10.42962	F (4,1592) = 15.450, p <.001s
Primary Education	216	31.5213	11.10631	
Secondary Education	701	28.4420	10.37079	
Post-Secondary	209	25.2273	10.43556	
University Education	241	24.9922	10.35306	
Total	1597	28.4223	10.76701	
<b>Region</b>				
South-West	352	28.8109	10.19243	F (5,1594) =15.617, p <.001s
South-South	258	26.9517	10.31516	
South-East	210	26.2904	10.12060	
North-West	367	32.2418	10.67887	
North-East	197	25.5222	10.35732	
North-Central	215	27.8324	11.55095	
Total	1600	28.4299	10.76455	
<b>Age</b>				
18-25yrs	596	29.5704	10.87421	F (5,1595) = 3.257, p < .006s
26-35yrs	501	28.0711	10.75090	
36-45yrs	262	27.7342	10.19797	
46-55yrs	132	26.8375	10.68368	
56-65yrs	67	25.8093	10.56445	

Educational background	N	Mean	S D	Statistics
66yrs above	41	29.1249	10.55120	
Total	1599	28.4052	10.72619	

It is not surprising to observe the differences that exist in climate change awareness among educational and regional groups. The findings indicate that the higher the educational qualification, the less the knowledge of climate changes. In contrast to other educational qualifications, those with tertiary education were more likely to be aware of climate change. Education is related to the acquisition of climate change awareness. There is no significant difference in the age group's awareness of climate change.

In this research, the post hoc analysis was conducted using the Turkey HSD to determine where the difference existed among the group. The results in Table 5 revealed that the three subsets were extracted for climate change awareness by region. Participants from North-East, South-East, South-South, and North-Central had a similar level of awareness and fell into a subset, whereas participants from South-East, South-South, North-Central, and South-West had a similar level of awareness of climate change. Participants from North-West had the highest level of awareness of climate change. Results also showed three subsets for climate change awareness by educational background. Participants with University education and those with post-secondary education had the least level of climate change awareness with a similar mean score while those with secondary education followed in the second subset. However, participants with primary and those without formal education had the highest level of climate change awareness and fell in the same subset.

Table 5. Summary of the Turkey multiple range comparisons of the mean scores on climate change awareness.

Region	N	Subset for alpha = 0.05		
		1	2	3
North-East	196	25.5222		
South-East	210	26.2904	26.2904	
South-South	258	26.9517	26.9517	
North-Central	214	27.8324	27.8324	
South-West	352		28.8109	
North-West	366			32.2418

Region	N	Subset for alpha = 0.05		
		1	2	3
Sig.		.137	.079	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 250.867.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Educational background	N	Subset for alpha = 0.05		
		1	2	3
University Education	241	24.9922		
Post-Secondary	209	25.2273		
Secondary Education	701		28.4349	
Primary education	217			31.5722
No formal Education	230			31.9649
Sig.		.999	1.000	.993

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 259.208.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Bivariate correlation was computed to describe the relationship between the dependent and independent variables. The results obtained are presented in Table 6. A significant positive correlation was observed ( $r = .97$ ,  $p < .01$ ) between gender and climate change awareness, place of residence (urban/rural) ( $r = .088$ ,  $p < .001$ ) and climate change awareness. There was also a strong correlation between the region of the respondents ( $r = .137$ ,  $p < .001$ ). These findings show that the sources of information measures and climatic change awareness are negatively correlated. These results brought to enquiry the type and richness of content of the information on climate change available on the various sources.

Table 6: Correlation between demographic, sources of information and climate change awareness of respondents

	Gender	Age	Education	Urban/ Rural	Region	Radio news	Television news	Newspaper news	Internet news	Social media news	Climate change Awareness
Gender	1	-.140**	-.113**	.003	-.001	-.127**	.012	-.147**	-.107**	-.082**	.097**
Age		1	-.146**	.037	-.053*	.053*	-.024	-.006	-.225**	-.245**	-.069**
Education			1	-.301**	-.162**	.169**	.426**	.298**	.482**	.458**	-.241**
Urban/Rural				1	.303**	-.081**	-.310**	-.147**	-.256**	-.272**	.088**
Regions					1	-.109**	-.251**	-.051*	-.097**	-.129**	.011
Radio news						1	.252**	.213**	.149**	.118**	-.129**
Television news							1	.419**	.445**	.433**	-.217**
Newspaper news								1	.527**	.476**	-.199**
Internet news									1	.877**	-.246**
Social media news										1	-.229**
Awareness											1

\*\* . significant at  $p < .01$ . \* . significant at  $p < .05$

A stepwise linear regression model was conducted. The results of the stepwise regression analysis for all respondents which are shown in Table 7 indicate that the most parsimonious set of predictors of climate change awareness internet news.

Table 7. Stepwise regression analysis of thirteen predictor variables used to predict climate change awareness of respondents (N = 1600)

Step		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	30.568	.334		91.634	.000		
	Internet news	-1.470	.143	-.249	-10.274	.000	1.000	1.000
2	(Constant)	33.479	.601		55.699	.000		
	Internet news	-1.660	.145	-.281	-11.418	.000	.949	1.054
	Age	-1.207	.208	-.143	-5.796	.000	.949	1.054
3	(Constant)	36.847	.875		42.093	.000		
	Internet news	-1.261	.163	-.213	-7.736	.000	.743	1.346
	Age	-1.254	.207	-.148	-6.066	.000	.947	1.056
	Educational background	-1.278	.243	-.143	-5.255	.000	.766	1.305
4	(Constant)	36.922	.874		42.253	.000		
	Internet news	-1.107	.171	-.187	-6.459	.000	.669	1.495
	Age	-1.193	.207	-.141	-5.754	.000	.937	1.067
	Educational background	-1.081	.252	-.121	-4.282	.000	.708	1.412
	Television news	-.513	.180	-.079	-2.843	.005	.735	1.360
5	(Constant)	34.646	1.285		26.953	.000		
	Internet news	-1.056	.172	-.179	-6.128	.000	.659	1.517
	Age	-1.100	.211	-.130	-5.221	.000	.906	1.104
	Educational background	-1.016	.254	-.113	-4.007	.000	.700	1.428
	Television news	-.561	.181	-.086	-3.095	.002	.726	1.377
	Gender	1.266	.525	.059	2.411	.016	.943	1.061
6	(Constant)	35.682	1.379		25.869	.000		
	Internet news	-1.049	.172	-.178	-6.092	.000	.659	1.518
	Age	-1.075	.211	-.127	-5.102	.000	.903	1.108
	Educational background	-.988	.254	-.110	-3.897	.000	.698	1.432

Step		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
7	Television news	-.488	.184	-.075	-2.647	.008	.700	1.429
	Gender	1.143	.528	.053	2.165	.031	.931	1.075
	Radio news	-.404	.196	-.051	-2.057	.040	.914	1.094
	(Constant)	33.538	1.718		19.522	.000		
	Internet news	-1.043	.172	-.177	-6.064	.000	.659	1.518
	Age	-1.065	.211	-.126	-5.057	.000	.902	1.108
	Educational background	-.882	.258	-.099	-3.412	.001	.671	1.490
	Television news	-.412	.188	-.063	-2.192	.029	.673	1.485
	Gender	1.218	.529	.057	2.302	.021	.926	1.079
	Radio news	-.431	.197	-.054	-2.192	.029	.910	1.099
Religion	1.111	.531	.053	2.090	.037	.860	1.163	

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	Change Statistics				
					R <sup>2</sup> Δ	F Δ	df1	df2	Sig. F Δ
1	.249 <sup>a</sup>	.062	.061	10.42900	.062	105.552	1	1598	.000
2	.285 <sup>b</sup>	.081	.080	10.32423	.019	33.598	1	1597	.000
3	.311 <sup>c</sup>	.097	.095	10.23927	.016	27.611	1	1596	.000
4	.319 <sup>d</sup>	.101	.099	10.21663	.005	8.080	1	1595	.005
5	.324 <sup>e</sup>	.105	.102	10.20126	.003	5.812	1	1594	.016
6	.327 <sup>f</sup>	.107	.104	10.19093	.002	4.232	1	1593	.040
7	.331 <sup>g</sup>	.110	.106	10.18017	.002	4.368	1	1592	.037

Others included age, educational background, television news, gender, radio news, and the region. Together, these seven variables explained 11.0% of the variance in climate change awareness among Nigerians. The influence of these variables was not statistically significant ( $F = 4.368$ ; sig.  $F \Delta = .037$ ). The results obtained only showed five of the variables - internet news, age, educational level, television news, and gender significantly influenced the awareness regarding climate change among Nigerians. The variation that these variables described was 9.9 percent ( $R = .101$ , Adjusted  $R^2 = .099$ ). The other two variables - radio news and religion - had an insignificant impact. It should be noted that three of the five sources of

information have been chosen from the seven predictor variables and have considerable impact.

The findings showed a high degree of sensitivity among respondents about climate change. The study found that most of the participants had awareness of the causes and effects of climate change. The finding is consistent with [Selormey et al. \(2019\)](#), who found that majority of the respondents used in their study showed a high level of global climate change awareness. The present findings contradict the findings of ([Kuthe et al., 2019](#); [Odafivwotu, 2015](#)), which reported participants' low-level awareness of climate change.

According to the results, respondents' primary sources of information about climate change awareness were radio and television. The results corroborated [Ogunbode et al. \(2019\)](#) research which reported participants gathering information from television and radio news through which and they are educated and informed about climate change. The t-test result showed a significant difference between the effect of gender as well as a place of residence (urban and rural) on respondents' awareness of climate change. These results contradict [Korkmaz's \(2018\)](#) findings of no significant differences in climate change awareness regarding gender, age, income, and educational status.

The findings found the presence of a clear correlation or the effect between gender and place of residence on climate change awareness. These findings align with the results of previous studies that generally found a correlation between gender and knowledge of climate change ([Chan et al., 2017](#); [Odafivwotu, 2015](#)). The study found out that respondents' level of climate change is a function of their sources of information. Findings, shown in Table 6, indicate a negative relationship between respondents' awareness of climate change and sources of information. There was also a positive correlation with the respondents' religions ( $r = .137, p < .001$ ), which indicates that the origins of measures of knowledge and perception of climate change correlated but negative.

All the correlation was significant at 1%, but not significant at 0.05 level. The negative association found in this study between educational level and climate change knowledge agrees with previous findings of scholars ([Ogunbode et al., 2019](#); [Sraku-Lartey et al., 2020](#)). [Sraku-Lartey et al. \(2020\)](#) study in Ghana results indicated that perception of climate change is not influenced by level of education. Over the decades, there has been an increase in levels of awareness, knowledge, and comprehension of climate change ([Capstick et al., 2015](#)).

[Knight \(2016\)](#) argued that this development in part to educational institutions' efforts to enlighten the public about the dangers of unabated climate change, and thus opined that a lack of formal education is associated with lower levels of climate concern. These findings are in line with the the import of Theory of Planned Behaviour ([Ajzen, 2011](#)), which states that action is based on an assessment of the behaviour's outcomes in terms of expected costs and benefits.

#### **4. Conclusion**

In this research, it was observed that most of the participants had a high degree of climate change understanding. The research finds that Nigerians' knowledge of climate change varies by socio-demographic factors, gender, educational background, age, place of residence, and region. Internet news, age, educational status, television, radio news, and gender are the key determinants of climate change awareness. These findings have added to the current literature and sparked fresh discussions about the role of information sources in climate change awareness. These results have implications for the design of climate change policies to raise knowledge and understanding of climate change. One of the consequences of these findings is that supporting media-supported efforts is particularly necessary to increase the level of awareness about adaptation to climate change.

Nigeria's government at the three levels (Federal, State, and Local) should promote increased knowledge and appreciation of the natural environment and of the risks posed by climate change and how to better manage. This can be realized by well-trained environmental health officers, agricultural extension workers from government agencies. Growing community understanding of the impacts of climate change makes it easier to reduce risks and strengthen adaptation. There is a need for government agencies, NGOs, the civil community association, and others concerned with issues related to the environment to make use of the internet and various other social media platforms to disseminate information related to climate change. To improve the local climate knowledge, community participation, and support climate action, climate-related themes and topics need to be integrated into school curricula at all levels of education.

It is important to note that the data used in this study is limited to the Nigerian state. Future researchers in this area of study can look into the African data for possible comparison at sub-regional and country levels.

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### **Author Contribution**

The three authors participated in every stage of writing the paper. Ayodeji Ifegbesan, Razaq Azeez and Sesan Mabekoje conceptualised the idea. Ayodeji Ifegbesan sourced for and download the data, Ayodeji Ifegbesan, and Razaq Azeez did the analysis while Sesan Mabekoje confirmed, interpreted, and discussed the findings. Razaq Azeez and Ayodeji Ifegbesan wrote the first draft, the authors collectively contributed to the revision and the final manuscript.

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