

Exploratory Data Analysis (EDA) of Social Media Impact on Lagos Residents during COVID-19 Pandemic

Mary Adewunmi

National Centre for Technology Management (NACETEM)
Lagos State, Nigeria

Sunday O. Akintelu, PhD

Department of Business Administration
Samuel Adegboyega University, Ogwa, Edo State, Nigeria

Waheed Oladele

African Institute for science Policy and Innovation
Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria

Olajide Taiwo

National Centre for Technology Management (NACETEM)
Lagos State, Nigeria

*Corresponding author: princefemi2002@yahoo.com

Abstract

The main aim of this study was to examine the impact and role of social media during the Covid-19 pandemic. The specific objectives were to examine the responses from the populace concerning the different versions of messages on Covid-19 in Nigeria, assess whether the media campaign created a reasonable level of mass awareness of the Covid-19 epidemic and its impact on the environmental health behaviour among the populace in Lagos State. The source of data was primary, using structured questionnaire. The copies of questionnaire were administered to respondents via social media platforms, specifically Whatsapp statuses and groups with Facebook. Exploratory Data Analysis (EDA), using pandas profiling was majorly used for data analysis. The results showed that social media have both positive and negative impact on humans by being a major source of disseminating important information, precautions to Lagos residents during the COVID-19 Pandemic. The researchers concluded that social media are one of the quickest ways to communicate ideas and information in a variety of formats leading to rapid divulgence of information during pandemic. Also, the lack of control measures to regulate the plethora of online information available for public consumption via social media outlets paved the way for both authentic and deceptive messages, misinformation and a major tool for rumours. It was recommended that there should be policies guiding Social media posts by scrutinising and vetting posts before publishing.

Keywords: Social Media, COVID19 Pandemic, Exploratory Data Analysis (EDA), Pandas profiling.

Introduction

On the African continent, Nigeria is still feeling the effects of the pandemic, having recorded her index case in February 2020, with an increasing number of cases everyday

and a current case fatality ratio of 0.03 as of 13 April 2020. Although, the number of reported cases appears lower than expected, it has been predicted that Africa will experience some of the worst effects of the pandemic by the end of the pandemic. In general, African countries' health systems are fragile, which is a source of concern, particularly in the event of increased outbreaks. Nigeria's current national health systems are incapable of meeting the growing needs of infected patients who require admission to intensive care units (Ohia, Bakarey & Ahmad). The media have significant roles to play in the current community. The news media quickly became the primary source of information about the novel coronavirus. Similar to the previous pandemics of Severe Acute Respiratory Syndrome (SARS) in 2003 (Zhong *et al* 2003), Influenza virus H1N1 in 2009 (Organisation, 2009), and Zaire ebolavirus (EBOV) in 2013(Briand *et al.*, 2014), the media played a significant role in the Covid-19 infodemics (Anwar *et al* 2020).The mass media- print, television, radio and the internet- has an unprecedented reach as a communication tool. Mass media also has a direct impact on the individual's life in both a positive and negative way, influencing all age groups in one direction and the potency by patronage to the other abstruse change, economic stagnation, education, well-being, employment, communal relationships, healthcare provocation to combat Covid-19 and many more in the society.

Virtual communication is critical for keeping the healthcare workforce connected across the country, especially with teams and patients in hot spots. It is critical to share all pandemic precautionary and treatment measures to reduce exposure and use best practices for better outcomes. During the pandemic, telecommunications will provide a foundation for those at all levels of the healthcare system to continue with their respective responsibilities, mitigating the negative effects of the current state of affairs and aiding in the flattening of the Covid-19 pandemic curve; hence, the need to look at the impact of social media on Lagos residents during Covid-19 pandemic.

Statement of the Problem

Since the dawn of time, various plagues have frequently threatened human survival. Virtually every country in the world is dealing with an outbreak of this lethal virus; many lives have been lost, and several active cases are being reported. Many people have lost their jobs as a result of the Covid-19 pandemic and many more are at risk in the future. As a result of the Covid-19 pandemic, many businesses have been forced to close. Because of their vulnerability and limited resources, some small businesses are particularly hard hit by the pandemic's outbreak.

Measures are taken to contain the spread of the disease, such as self-isolation or quarantine, social distancing, a ban on social gatherings and market closures and all these affected their operations, sales and profits. Due to this lockdown, social media serve as invaluable tools for disseminating information and have evolved into a potential propaganda tool. Gonzalez-Padilla & Tortolero-Blanco (2020) established the important advantages and disadvantages that are associated with the use of social media platforms during the pandemic. In Nigeria, it serves as a double-edged sword by allowing citizens to access information without hindrance. This same tool, however, has been abused as people hide behind its anonymity to spread false messages and cause panic among members of the general public.

Research Objectives

The objectives of the study were to:

1. Examine the responses from the populace in regards to the different versions of messages on Covid-19 in Nigeria.
2. Investigate whether the media campaign created a reasonable level of mass awareness of the Covid-19 epidemic, causes, effects and prevention.
3. Examine if the awareness made by social media create any positive impact on the environmental health behaviour among the populace in Lagos State.

Research Hypotheses

The following null hypotheses guided the study:

- H₀₁: The response rate of Covid-19 has no significant impact on the populace concerning the different versions of messages by social media.
- H₀₂: Media campaign does not create a reasonable level of mass awareness of Covid-19 epidemic, causes, effects and prevention.
- H₀₃: Awareness made by social media does not create any positive impact on the environmental health behaviour among the populace in Lagos State.

Conceptualisation of Covid-19

Coronavirus disease 2019 (COVID-19) is a disease caused by a new coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV). The World Health Organisation (WHO) declared the outbreak a Public Health Emergency of International Concern in January 2020 and it was classified as a pandemic in March 2020. On October 5, the WHO reported that one in every ten people worldwide (approximately 800 million) may have been infected with Covid-19. Worldwide, 35.8 million cases had been confirmed as of October 7, 2020. The more than 1.04 million deaths attributed to Covid-19 are a more reliable indicator of the case spread Covid-19 has been linked to over 1.04 million deaths (WHO, 2020).

Although, there are cures for illnesses and advances in technology, the most powerful and effective weapon that society has against this virus that affects not only health, but also economics, politics, and social order is the prevention of its spread. Hand hygiene, social distancing, and quarantine are the main points in preventing the spread in society (Opel *et al* 2021). Detecting more Covid-19 positive patients in the community with increased testing capacity will also allow for a reduction in secondary cases with stricter quarantine rules. In moderate cases, people are infectious for seven to twelve days, and in severe cases, they can be infectious for up to two weeks (Berawi *et al* 2020; Desai & Patel, 2020; GÜNER, Hasanoglu & Aktas, 2020); Schuchat, Covid & Team, 2020).

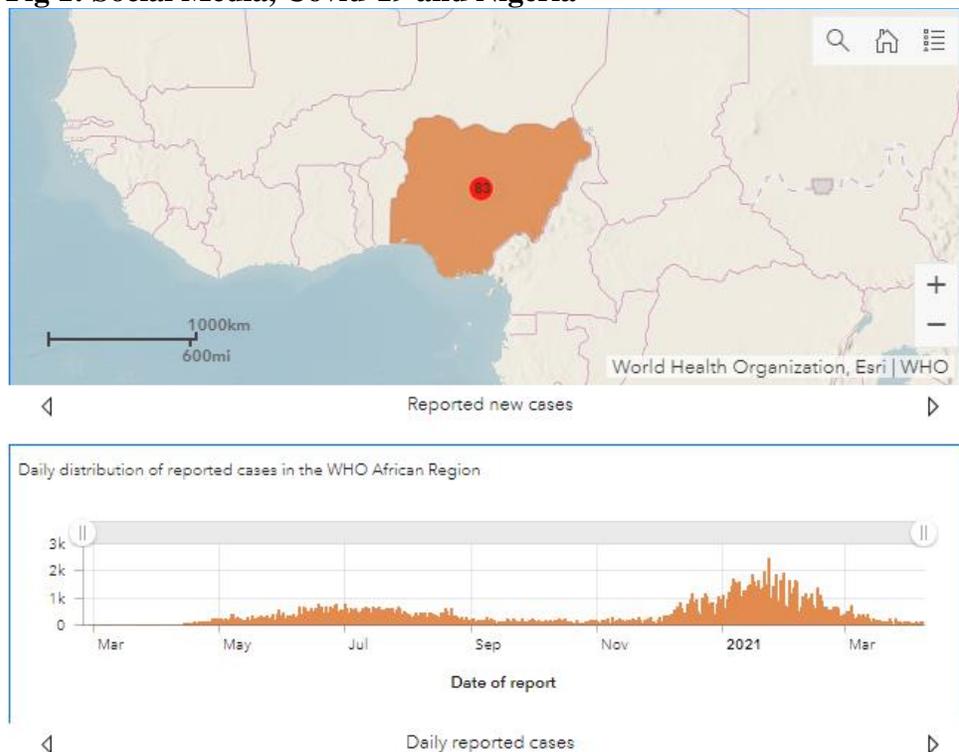
COVID 19 and Nigeria

Nigeria reported its first case of coronavirus on February 27th, 2020, in the state of Lagos, with an index case of a man who arrived in the country on February 25th from Milan, Italy (Adegboye *et al* 2020; Adepoju, 2020; Ebenso & Otu, 2020). Since the index case was reported by the Nigerian Center for Disease Control (NCDC), so many Covid-19 cases have been recorded and reported in almost all states in the country; with special reference to Lagos and Abuja, the Federal Capital Territory, which have recorded more

cases of the novel virus due to their economic and administrative position in the country, with both having major endemicity. The total number of people affected by this pandemic has risen to 1,530.

The news of a Coronavirus outbreak in Nigeria caused citizens to experience anxiety, panic attacks, and tension, making some citizens so vulnerable that they digested and swallowed every available information about Covid-19 hook line and sinker without verifying the veracity of this information, indulging in actions that were more harmful than the virus itself (Aguh & Adamu, 2021). The rate of transmission and contagion of this virus also heightened the fear and anxiety expressed by citizens in the country, resulting in an urgent need for rapid crisis communication, enlightenment, sensitisation, and education among Nigerian citizens by the Federal Government and concerned bodies via the various mass media. As of April 10, 2021, there are 83 new reported cases of Covid-19 in Nigeria, 163,581 cumulative cases (5.25 % of all the cases in the Region). The attack rate of 78.95 per 100 000 population.0 new reported deaths, 2,058 cumulative deaths with a CFR of 1.26%.154,005 cumulative recovered (94.15% of cumulative cases).7, 518 active cases (Roser *et al* 2020).

Fig 1: Social Media, Covid-19 and Nigeria



Health-related issues, for example, draw a lot of media attention. This can take the form of print, electronic, internet or social media attention or a combination of all three. What matters most, in whatever form it takes, is the level of impact of media intervention in health crises, particularly disease outbreaks. The media cannot cure a virus, but it can help to prevent its spread (Adekunle & Adnan, 2016). This statement emphasises the role

of the media in health reporting, particularly in containing the spread of infectious disease outbreaks (Onwe *et al* 2020).

Theoretical Framework

Theoretically, the study is anchored on Katz & Foulkes (1962) and Latante (1981) model. The paper focused on social media theory as well as uses and gratifications theory. Social media theory was developed at the time when social media is not in existence. Latante (1981) theory suggests that social media offer force in the forms of friends, colleagues and family. It focuses on how people related with one another and whose opinion is matter between them. Social media also offer propinquity; it related to how people are connected to one another not beyond mobile devices; and it further offers massive opportunity for the number of people in particular group.

Uses and gratification theory is an approach to understanding why and how individuals actively seek out and use specific media to satisfy needs (Katz & Foulkes, 1962).

It comes to an existence in 1940s when Herzog (1944) coinage the term gratification of satisfaction to depict specific types or dimension of satisfaction reported by audience for day time radio programmes. Uses and gratifications addresses how individuals intentionally choose media that will satisfy their needs, allowing one to realise gratifications such as knowledge enhancement, entertainment and relaxation, social interaction (Ko, Cho & Roberts, 2005; Calder *et al* 2009).

Uses and gratifications was plan of attacking the active role of the masses in media choice it suggest that individual person searching for identify with and adopt media to fulfill specific gratification needs (Ku, Chu & Tseng, 2013). In this sense use and gratifications theory posit that individual have freedom of determining their interaction and engagement with particular media. Thus, a well-structured theoretical perspective of uses and gratification shed interesting approaching on new, contact medium necessitate a higher level of interactively between users, when compared to more traditional forms of media (Ruggiero, 2000; Ko *et al* 2005). Also, it has significantly influence the spread of information globally, especially during pandemic.

Empirical Review of Literature

The world has experienced varying pandemics in the past from the Antonine plague (165 AD), the Black death (1346–1354), the Spanish flu (1918–1920), the Asian Flu (1956–1958) among others. The Covid-19 pandemic is a recent phenomenon and its study is still limited. To this end, the literatures used in the analysis of this research are largely materials conducted on other pandemics which have affected the world. Also, works on social media and its influence as a tool of information dissemination are similarly reviewed. Elmahdawy *et al* (2017) investigated the experiences of the victims of Ebola virus as it pertained to health systems and the effects this virus had on economies of African countries. The authors canvassed for the revamping of the healthcare systems of Third World countries, militated against by inadequate information sharing systems and the need to involve donor agencies to curb the virus spread in case of a relapse occurs. Unfortunately, Africa was still gasping from Ebola virus when the coronavirus pandemic once more exposed further several deficiencies in Africa's primary health care systems;

which had been railing from poor funding by narrow-minded leaders who prefer medical tourism abroad to fixing basic primary health care infrastructure in the continent.

Additionally, Oleribe *et al* (2015) emphasised that African countries were unprepared to tackle the outbreak of Ebola virus just as with the case of Covid-19. In Nigeria, there was no preemptive closure of borders until the index Italian case forces panic stringent lockdown of the major epicentres of Lagos and Abuja. This led to the shutdown of educational institutions and prompted delays in programs such as the National Youth Service Corps. Consequently, there was a massive mobilisation, awareness creation and sensitisation of the citizenry to the dangers, symptoms and signs of the virus. The unintended outcome of coronavirus pandemic was the special emphasis on hygiene and sanitisation.

In their own research endeavour, Cenciarelli *et al* (2015) analysed the wide spread of the Ebola Virus disease in the different West African countries. They attributed the spread of the virus to the reactions of several communities to the virus due to the mistaken beliefs about the origin of the disease and how it could be contained as a result of wrong information which increased the mortality rates during the pandemic (Cenciarelli *et al* 2015). In Nigeria, where a good number of citizens believe that the virus is a hoax created by the government to corruptly enrich few State officials. This belief is difficult to erase from the minds of many people, thus making almost impossible to adhere to personal hygiene instructions issued by both the WHO and the Nigeria Centre for Diseases Control (NCDC).

Furthermore, Brandt *et al* (2011) writing on “the impact of the 2009 Influenza A (H1N1) pandemic on attitudes of healthcare workers toward seasonal influenza vaccination 2010/2011,” assert that the risk in communication is a challenge in the attempt to curtail the spread of infectious diseases. The people, at the time, rejected the vaccination required of them to prevent the spread of the flu due to ignorance and hysteria. As such, it becomes imperative to provide the public and healthcare workers with relevant information capable of banishing any ambiguities and aiding in the prevention of the infectious diseases so as to decrease panic. Humphrey (2018) in her study of the influenza identified the social behaviors of cities that had lower risks of infections which had enforced the isolation of sick persons, the quarantine of their contacts, school closures and bans on public gatherings. In addition, the spread of the virus affected those who were victims of bacterial infections, malnutrition and malaria. Some communities compulsorily imposed the wearing of face masks. It was also discovered that several persons misused the facemask as some were improperly made. This is self-evident with the Covid-19 preventive measures as regards the use of facemasks. In Nigeria, the urban poor and those living in rural areas use only one face mask day in day out on the claims that they washed it daily.

Garett (2007) outlines further that in some cities with lower mortality rates, the pandemic was curtailed by shutting down public places, closing down schools, churches and limiting commercial activities. An important point he expresses in his research is the role the media plays. As such, even as far back as 1918, there were articles with dubious remedies on how to cure the influenza and articles on churches, schools and theater closings with lesser news on how the influenza affected the economy (Garett, 2007). He further argued that any future pandemic would prove to be more severe in its reach because of the increased population in the world and would therefore be more detrimental. Unfortunately, his assertions are the realities of the Covid-19 pandemic, as

there remains an unimproved health sector by virtue of which those living in urban areas have better access to health care while the rural poor are in most cases neglected in Africa. More so, DiMaggio (2011) admits that the Internet changes society and this is supported by Bowd (2016) who posits that the advent of social media came with opportunities for news outlets to engage more people thereby leading to an increased spread of information to a wider audience.

Meanwhile, the research conducted by Oginni & Motui (2015) analysed the engagements of Africans with the social media. These scholars assert that the engagement of Africans with social media is relatively low and that authors did not fully explore the impacts of social media usage for civic engagements in individual countries or sub-regions of the African continent. To this end, the pandemic has made Africans, specifically Nigerians to be more active in social media in order to keep up with the global sphere. In a nutshell, while the patterns as to what caused the spread of previous pandemics are still being fully underscored, the measures adopted by the government and by the populace to curtail the pandemic and its challenges were identified by the above researchers, but little attention have been given to the role of social media *vis-à-vis* global pandemics. In the Nigerian context, social media is a means of keeping up with occurrences all over the globe and is used to shed light as regards the Nigerian situation. The penetration of social media is quite extensive in Nigeria, particularly since the advent of cheap android smartphones telephony. What is worrisome is how to sieve authentic information from an avalanche of half-truths and false information available on social media networks.

Methodology

Descriptive design was used for collecting data and techniques used in this study. Kothari (2004) states that research design is the arrangement of conditions for the collection and analysis of data in a manner that aims at combining relevant information to the research purpose. He continues to argue that a research design is necessary because it allows the various research operations to run smoothly by making research as efficient as possible and yielding maximum information with the least amount of effort, time and money. The descriptive research design will be used to describe the characteristics of the community, population, organisation or people taking part in the study.

For data collection, the instrument that will be used in the study is a questionnaire. Using a purposive sampling technique, the copies of questionnaire were administered to respondents via social media platforms, specifically WhatsApp statuses and groups with Facebook, in Oshodi/Isolo Local Government Area of Lagos State. A self-structured questionnaire was developed by the researcher with Google form. The questionnaire was divided into two (2) major parts, first part contained questions on the demographic data of the respondents, while the second part contained items designed to elicit information from the respondents about the research questions. The population of this study includes both male and female respondents selected in the Oshodi/Isolo Local Government of Lagos State. The population of this study consists of 7830 employees Oshodi/Isolo Local government of Lagos state (<http://lagosstate.gov.ng>). The computation of the sample size was done using Taro Yamane formula of 1964.

The formula is given as:

$$n = \frac{N}{\quad}$$

$$\begin{aligned}
 & 1 + N(e)^2 \\
 &= \frac{7830}{1 + 7830(0.05)^2} \\
 &= \frac{7830}{20.575} = 381
 \end{aligned}$$

The sample sizes of the population (381) were examined through questionnaire administration to the staff of the organisation. Random sampling technique was then used to select the population sample for the study. Hence, 381 respondents were selected for the study. The primary data were collected through structured questionnaire administered from the Oshodi/Isolo Local Government Area of Lagos State. The questionnaire elicited information on various forms of attribute of social media on Lagos residents during Covid-19 pandemic. However, usable data were received from two hundred and sixty-eight (267) filled the questionnaire. Data were analysed using apandas library called pandas profiling. This is an open-source module used for exploratory data analysis of datasets and is generated with a few lines of python code (Brugman & Eaves, 2020).

Results

Figure 2: Overview of the Respondents

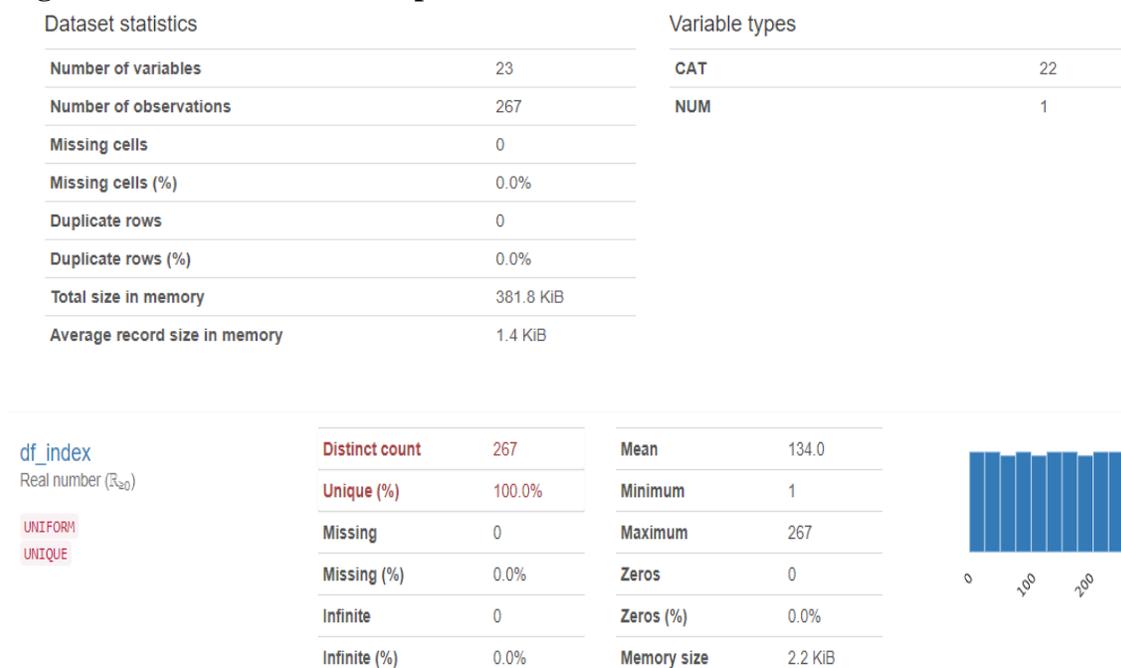


Figure 2 explains basic data information such as the number of columns, 23 (including 1 index row) and 267 rows. The datasets is a categorical (22) and numerical data type (1) with a data size of 381.8KiB in the memory, no duplicate rows, percentage of missing values. The figure focuses on a thorough examination of each variable including its uniqueness, the mean which is 134 and the size the variables occupied in the computer

memory, which is 2.2 KiB. This revealed that the dataset is categorical, with a value distribution of 0-200. The percentage of missing values is 0% for each variable displayed.

Figure 3: Demographic Pattern of the Residents

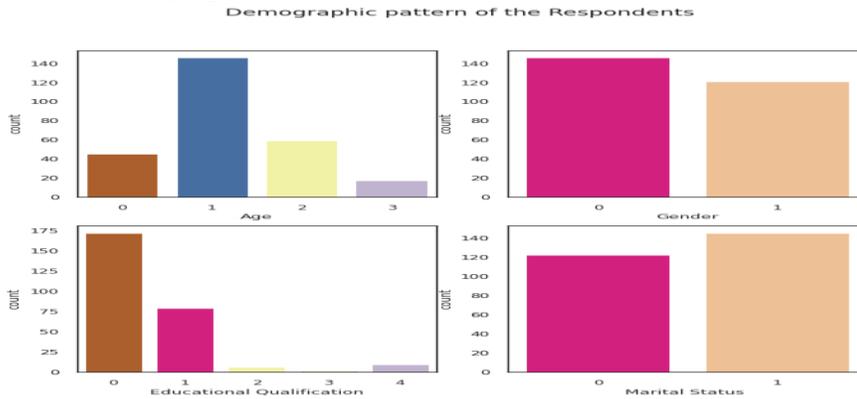


Figure 3 conveyed that out of the 267 respondents that filled the questionnaire, one hundred and seventy-two(172) had B. Sc, while seventy-nine(79) had Masters, nine(9) had SSCE and PhD had just six(6). Interestingly, this table shows that marital status of the respondents was majorly single which is slightly higher than the married ones.

Figure 4: Social Media for Covid-19 Information



Figure 4 reiterated that majority of the respondents felt that social media was a reliable tool for having access to Covid-19 updates and the necessary precautions to adhere to during the lockdown.

Figure 5: Social Media Pandemic Information



Figure 4 and 5 shows that in the event of a global emergency, such as a pandemic, the dissemination of accurate and timely information is critical to the collective response. Social media or forms of electronic communication that facilitate the dissemination and sharing of information, ideas, pictures and videos, can be an especially effective tool for this.

Figure 6: Misinformation with Social Media Platforms

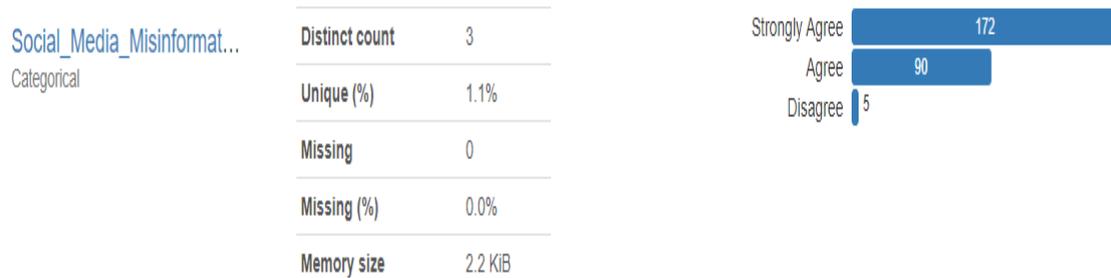


Figure 6 showed that majority of the respondents strongly agreed that social media platforms serve as a tool for spreading misleading information during Covid-19 pandemic. This further confirmed that the interaction patterns of each social media platform, combined with the unique characteristics of each platform's audience, play a critical role in the spread of information and misinformation.

Figure 7: Social Media used for Educational Purpose

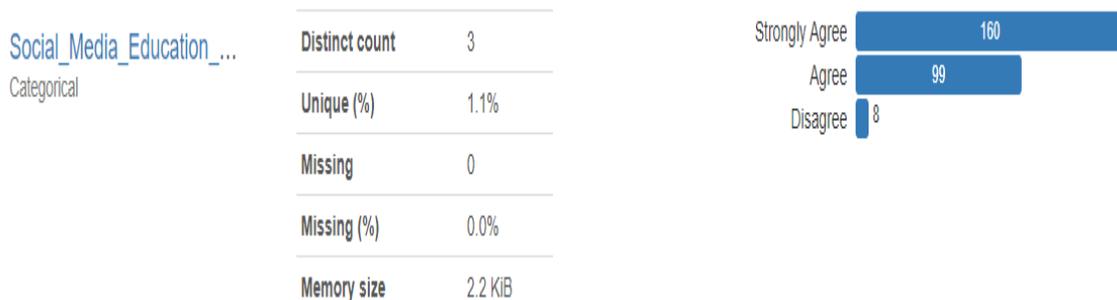


Figure 7 reiterated that Lagos residents, specifically students were able to learn, using social media. This encouraged both individual and group learning during the educational disruption of study and most did not believe they can learn without walls, until Covid-19 pandemic came. The increase use of technology in education has changed teachers' methods from a traditional approach popularly known as knowledge dispensers to a more flexible approach in which they act more as facilitators, mentors and motivators to inspire students to participate and learn.

Figure 8: Social Media as a Major Source of Rumour in Lagos

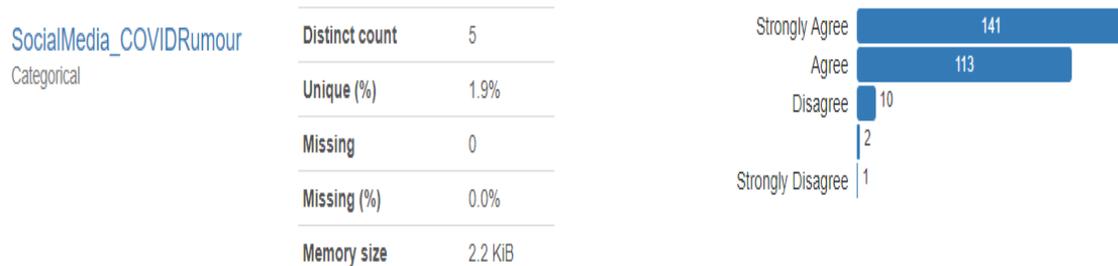


Figure 8 shows that the advent of social media, everyone is a news publisher. The intriguing aspect of social media is its persuasive power leveraging on its imagery tool (photo and video sharing) to drive its claims home. The verifiability of information passed through social media is frequently impossible. This may be due, in part, to the difficulty in tracing the source of such information.

Figure 9: Impact of Social Media on Health

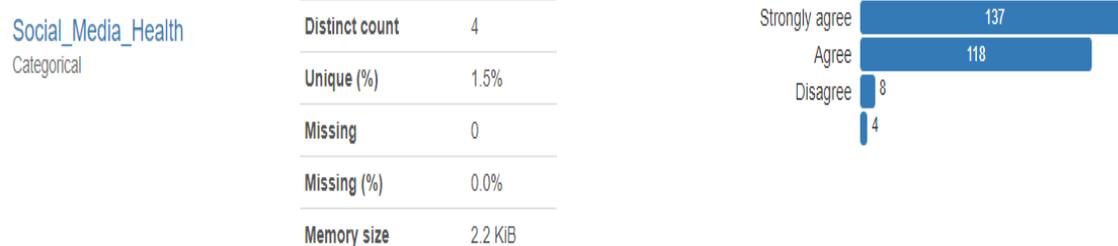


Figure 9 shows that from the variety of perspectives during the pandemic, the term "quarantine" was one of the most frequently used in the context of public health and peculiar to Nigeria was "quarantine cost." However, comments indicated that the fear of being quarantined and bearing the cost personally could cause peoples' health to be negatively affected, increasing the difficulty of enforcing the quarantine order, also the isolation and the stigma was on the increase with the infected Covid-19 patients in Nigeria. Also, it is worth noting that some comments expressed greater anxiety about being quarantined than about being infected by a virus.

Figure 10: A Line Chart among the Variables

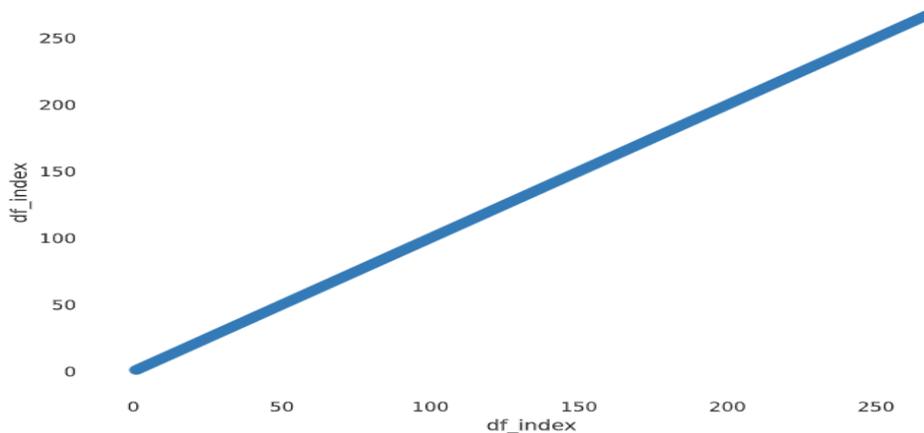
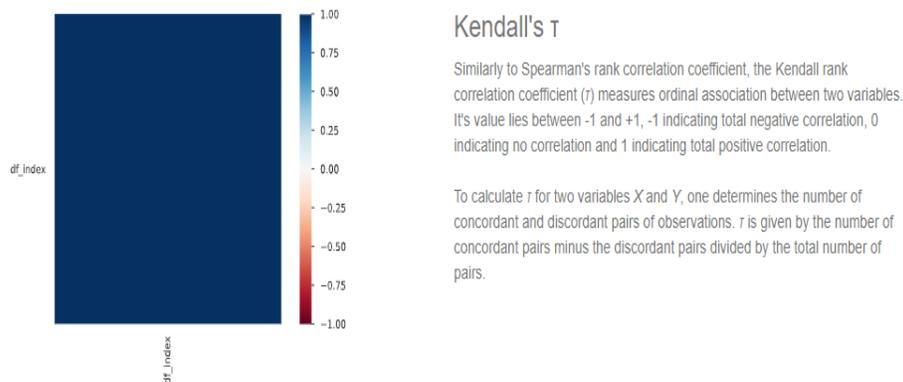


Figure 10 showed that there is a linear relationship among the continuous variables used as markers and these are connected by straight line segments during the quick data visualisation. This also confirmed that there will be a continuous relationship between social media and Covid-19 variables used in the questionnaire for data collection.

Figure 11: Kendall Rank Correlation



Kendall rank Correlation or Kendall's τ coefficient of +1 showed that the variables are highly correlated with one another meaning any of the variables determine the associated variables.

Figure 11 corroborated the line graph in figure 10 that there exists an increasing rank among the hypothetical variables and this indicates a positive relationship among the variables used for the *pandas* profiling of the respondents' data. This also reiterates that there is a strong relationship between variables measured. Social media have a greater impact when compared with Covid-19 related information collected among Lagos residents during the pandemic.

Discussion

Looking at the research hypothesis, the social media played a major impact as the major means of communication for disseminating information about Covid-19 and the precautionary measures to take in the outbreak. There was mass awareness of Covid-19 causes, effects and prevention, but the impact was two-sided- positive impact for the awareness, but negative impact because social media were used as tools for misinformation and passing round rumours among the Lagos state residents which could have a greater psychological effect on humans and trust issues in the future.

According to the participants, social participants reported that social media had a significant impact on spreading fear and misinformation about the Covid-19 outbreak in Lagos. Previous epidemic research has shown that social media are effective in providing the public with factual information, timely updates and relevant advice (Omrani & Shalhoub, 2015). Olaitan (2021) opines that remote learning, distance learning, blended learning, mobile learning, distributed learning, virtual learning, cooperative and collaborative learning are all made possible by technology. The majority of education is becoming digital, and education stakeholders, including students, are facing the challenge of transitioning to online education (Onyema *et al* 2020). Unsuspecting members of the public are prone to accepting the content of information obtained from these media outreach efforts without verifying it (Adesegun *et al* 2020). The disparity in attitudes toward the terms "quarantine" and "mask" demonstrated some peoples' concern (Chan *et al* 2020; Yu *et al* 2020).

Conclusion

Social media are one of the quickest ways to communicate ideas and information in a variety of formats, including visual (video and pictures), audio and letter forms. They allow information to travel the length and breadth of the globe. They keep people up to date on what is going on in the rest of the world. However, the lack of control measures to regulate the plethora of online information available for public consumption via social media outlets paved the way for both authentic and deceptive messages to reach a large audience. This has the potential to put members of the public in a bind due to a lack of ability to distinguish between the genuineness and inaccuracy of information published. In conclusion, this research showed that social media have both positive and negative impact. The positive effects are rapid divulgence of information during pandemic, increase in learning without walls and change of mindsets while its negative impact showed that social media could also be a bad vice for misinformation and a major tool for rumours which might discourage Lagos residents from using it as a major means of communication in the future especially during pandemics.

In light of the exploratory data analysis above, it is recommended that there should be policies guiding Social media posts by scrutinising and vetting posts before publishing. Also, a standard Information Technology (IT) architecture needs to be put in place for educational institutions in the future in case of pandemics and the schools that are online already should maintain a hybrid system built during the pandemics and finally, there should be enough social media sensitisation to Lagos residents and Nigerians that social media have come to stay.

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